ENVIRONMENTAL IMPACT ASSESMENT REPORT

M/S STAR WASTE MANAGEMENT FACILITY CHAK NO 250 UMEED PUR DISTRICT FAISALABAD

Contents

Executive Summary

Title and location of project

The subject proposed project is an initiative to collect, consign, transport, segregate, treat, dispose off, store, handle and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste under the name of M/S Star Waste Management facility and site of the proposed project is located at Umeed Pura Chak No 250 District Faisalabad. The proposed project will collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste at the proposed site. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed. Project will mainly deals with reduce, reuse, repurpose and recycle of Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste to promote cleaner practices and to reduce waste volume and amelioration by definition, is something that the producer no longer requires and therefore discards. In many industrial economies, the traditional approach to waste has been to dispose of it as cheaply as possible, without much concern as to what happens once the waste leaves the producer's premises. The ash is mostly formed by the inorganic constituents of the waste; The Ash obtained from incineration will be sold/used as filler in cemented blocks and tough tiles. This proposed project will be liable to solid waste managements and air pollution control technologies.

The total area of the proposed project is 8 Kanal where as 4 marla will be the open area of the land. The total cost of proposed project is approximately 5-8 million. LPG gas will be used as source of ignition in proposed project.

The project falls under Schedule II clue-G for EIA, of PEPA, Regulations, 2022 As project of waste disposal, TORs of the study under clause 5 (f) of policy and procedure for the filing, review and approval of environmental assessment are annexed as **Annexure-B**

Project Proponent

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CNIC of the Proponent and relevant documents are attached as Annexure-C

EXISTING ENVIRONMENTAL CONDITIONS

For the purpose of this report, environmental and social baseline data and conditions at/around the project site has been studied. The data has been gathered from sources of information included consultation with project proponent, private visits, field surveys, desktop studies, existing information sources. Interviews with people near the project area has been conducted to collect their opinion regarding the proposed project and after finding it has been concluded that the project will not have any major adverse impacts on the socio-economic environment of the existing community. As the project is outside the main city, in barren fields so the functioning of the project will not be the reason of nuisance for the nearby community. Moreover, the project will pose the positive impacts in terms of employment opportunities as it will create jobs during construction and operation and will contribute to the nation economy by meeting the demand. Also, the hazardous waste of Hospitals and Industries will be incinerated to reduce the load of waste

Brief outline of project:

Table 1: Brief outline of the project

Name of Project	**M/S Star Waste Management Facility**
Purpose of the Project	Waste Disposal/ Management
Cost of Project	5-8 Million
Land Requirement	
Total Area allocated for proposed project	8 Kanal
Status and location	
Site for proposed project	Umeed Pura Chak No 250 District Faisalabad
Description of project	proposed project is an initiative to collect, consign, transport, segregate, treat, dispose off, store, handle, incinerate, Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste

Water Requirement	
Water consumption for the project	500 Gallon
Ways of extraction	Motor pump,
Source of Water consumption	Underground.
Quantity of waste water	75-85% of total used water
Source of waste water	Constructional and Domestic Waste
Mode of treatment	During land development and operational phase septic tanks will be installed for treatment of domestic waste water. As there will be no process water in operation phase, so waste water will be domestic in nature.
Mode of Disposal	Drain out into nearby Drain. Or within the project pen land
Solid Waste	
Source of solid waste generation	Constructional waste and Ash generated from incinerator during operation phase/
Manpower	
Labor Force	About 10-12 person during construction and 4-5 people during operation phase.
Power requirements	
Source of power	WAPDA

The major impacts:

Table 2: Major Impacts and mitigation measures

Impacts	Mitigation Measures

Project Location	
• **Acquisition of land** • **Loss of environmentally sensitive areas** • **Changes in traffic pattern** • **Potential conflicts with stakeholders** • **Resettlement issues**	✓ It is recommended for obtaining of approval from other relevant departments. ✓ The proposed land has been taken on rent and rent agreement is attachd with file for the M/s Star Waste Management Facility. ✓ There is not any sensitive area near the project site. ✓ Proponent will achieve the PEQS/ PEQS at the boundary walls of the subject project to avoid the environmental impacts on the nearby industrial unit. ✓ There is no need to change the traffic pattern due the development of the subject project because no. of industries has been developed at the same road. ✓ It is recommended to settle the issues through scoping and specific group discussions. ✓ No resettlement issues
Project Design	
• **Structure stability** • **Soil structure and soil bearing capacity** • **Road infrastructure design** • **Emergency exits** • **Firefighting system** • **Wastewater disposal system design** • **Electricity hazards** • **Ventilation**	✓ Structure stability of the project building should be ensured ✓ Geotechnical investigation of the project site should be conducted. ✓ Safe road infrastructure design should be provided at the project site. ✓ Emergency exist points should be marked within the project building. ✓ Firefighting equipment must be maintained at the site in good working condition. ✓ Efficient wastewater disposal system should be designed for proper treatment of wastewater

	✓ Electricity system should be designed safe and sound. ✓ Proper ventilation should be ensured in the project building.
Construction and operation phase	
Land & Soil	
• **Land or Soil Erosion during the construction phase** • **Habitat destruction** • **Scarring of the landscape and aesthetic beauty.** • **Clearing of native plants will disturb the complexity of the ecosystem of the proposed area.** • **Leakage of oil from storage area may contaminate soil**	✓ Sprinkling of water is recommended ✓ After construction phase, the project Proponent will restore the land by plantation. ✓ All spoils will be disposed of as desired and the site will be restored back to its original conditions ✓ Aesthetic of the area will be maintained. ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire
Air pollution and Dust emission	
• **The transportation of the project machineries and material also may cause dust.** • **Un-metaled roads may cause dust.** • **Dust raised on dirt tracks by project-related vehicles.** • **Dust from drilling of deep holes.** • **Combustion products from vehicles used for project-related activities**	✓ Air emissions-controlled devices must be installed to control the air pollution ✓ Water the construction site periodically to minimize fugitive dust generation while laying foundation ✓ Store all construction materials in a manner to minimize generation of dust and spillage on roads. ✓ During excavation works drop heights will be minimized to control the fall of materials reducing dust escape. ✓ Sprinkling of water must be done to control the dust or PM ✓ Vehicle emissions inspection should be done on regular basis

	✓ Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter. ✓ Vehicles/ trucks should be serviced regularly ✓ All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.
Noise	
• **The major sources of the noise at proposed project site are project related machinery.** • **High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mentally disturbance.** • **Noise level will not exceed 75 dB(A) at the distance of 2 km radius, activity site is located at a safe distance from the nearest human settlement.** • **Noise from construction activities from site preparation, earth works, foundation and plant equipment installation**	✓ Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. ✓ Proper maintenance and tuning of the vehicles should be done. ✓ Sound proof room should be built for generator (if any) to control the noise. ✓ A speed restriction of 40 km/h will be imposed on all construction vehicles.
Waste Water	
• **Domestic waste water from the camp** • **Minor generation of waste water from construction activity.** • **Water Contamination due to improper storage of construction material,**	✓ Domestic waste water will be drained out in nearby local drain after treated in septic tanks ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall

• **Water contamination due to improper debris disposal,** • **Spread of diseases, underground water contamination**	
Solid waste/Ash	
• **Solid waste may generate from construction activity, domestic and packing material of project related machineries.** • **Solid waste may generate from operation of project.**	✓ A solid waste management division should be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. ✓ Solid waste generated from the construction activity as sand, stones residues etc. that should be utilized in restoration of the quarry area whereas solid waste from the domestic sources should be disposed off properly ✓ Proper solid waste management system is recommended. ✓ Solid waste related to the operation will also manage in scientific way. ✓ Ash generated from Incinerator will be disposed off in landfill sites.
Health and Safety	
• **Health and safety issues will be arisen during construction activity, handling of material, machinery and improper practices of work** • **Health safety issue may arise during regular operations**	✓ Use of PPEs should be implemented at workplace. ✓ First aid measures/medical facility should be provided to project related employees. ✓ Safe drinking water must be provided to workers, staff, and poor people of the area. ✓ Water consumption records should be maintained ✓ Safety signs & boards should be placed at during construction activity.

	✓ Construction site should be fenced properly to avoid any damage to nearby settlements ✓ smoking or any drugs should be prohibited during working hours or performing work ✓ At the time of earthwork, fencing will be ensured for the area under the exploration

Proposed Monitoring

To oversee the environmental performance of the project through its lifecycle enforcing the PEQS an Environmental Monitoring Program should be formulated which ensures effective surveillance of the environmental parameters at various stages of the project development and compliances with PEQS and legal obligations. Monitoring for following Environmental Parameters is recommended:

- **Ambient Air, stack and vehicular emissions**

  Monitoring for stack and vehicular emission should be conducted during construction phase of the project and report should be submitted to EPA Punjab.
- **Noise**

  Regular monitoring for noise level should be maintained periodically during construction phase of the project and report should be submitted to EPA Punjab.

- **Water quality**

  Regular monitoring of water quality should be conducted on monthly basis during construction phase of the project and report should be submitted to EPA Punjab. Record should be maintained regarding the underground water pump and consumption.

Recommendation: Environmental Monitoring data log book should be maintained by the Proponent.

ENVIRONMENTAL MANAGEMENT & MONITORING PLANS

For the effective implementation and management of the mitigation measures, an environmental management plan has been prepared. The EMP satisfies the requirement of Pakistan Environmental Protection Act. The EMP outlines the aims and objectives, defines the responsibilities of the project owners and contractors and lays down the required communication, reporting procedures and mechanism through which the proposed measures will be monitored. Environmental impact of a project is worked out using various factors and parameters, so that an Environmental Management Plan can be evolved to take mitigation measures, wherever these might be considered necessary in order of appropriateness of elimination, reduction and compensation as the goals. The development of the EMP is to make some person responsible for implementing the mitigation measures as identified so that smooth implementation of the mitigation measures can be assured. Monitoring plans have also been included to ensure the compliance of the EMP by M/S Star Waste Management Facility. Environmental management approach for the project has been presented for the design, construction and operation phase and to mitigate the adverse impacts during the design, construction and operationphase essential mitigation measures have been recommended and for their sound implementationof EMP.

Sr No	Impact	Project activity	Monitoring mechanism	Frequency	Monitoring authority
Construction and operational phase					
1	Air emissions and dust	Air quality will deteriorate due to transportation and construction activities	Monitoring for the air quality as per PEQS,	Quarterly	Proponent/ Contractor
2	Water pollution	Water quality will deteriorate due to construction and operational activities	Monitoring for waste water & drinking water quality as per EPA PEQS,	Quarterly	Proponent/ Contractor
3	Noise pollution	Construction activities, utilities and transportation activities	Monitoring for waste water & drinking water quality as per EPA PEQS,	Quarterly	Proponent/ Contractor

Chapter# 1

INTRODUCTION

This Section of the report provides an overview of the rational of the Project, objective of project, requirement of the project, purpose of the report and approach adopted to conduct the Environmental Impact Assessment (EIA).

The project mainly deals with the collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed. Waste, by definition, is something that the producer no longer requires and therefore discards. In many industrial economies, the traditional approach to waste has been to dispose ofit as cheaply as possible, without much concern as to what happens once the waste leaves the producer's premises. This attitude is now changing as greater environmental awareness is reflected in more stringent waste management legislation and a genuine desire on the part of industry to improve environmental performance and meet customers 'expectations The environmental risks associated with poor waste management are well known and understood. Carelessly disposed of wastes, such as solvents, can leach into the groundwater and contaminate drinking water supplies.

Incinerators will be operated with adequate pollution abatement equipment and will not release any toxicgases. The recycling and composting facilities can be a source of litter and unpleasant odor ifnot properly regulated. Waste producers carry their share of responsibility to ensure that such polluting incidents do not occur. Under no circumstances should hazardous wastes be dischargedinto the environment.

Purpose of the report:

The purpose of Report is to conduct Environmental Impact Assessment (EIA) of proposed project. The EIA is conducted under the Legal framework of Pakistan Environmental Protection Act, 1997 and Review of IEE/EIA Regulations, 2022 to seek the Environmental Approval.

In compliance with the applicable Environmental Regulations, Proponent decided to get the NOC of the project. In order to fulfill the legal requirement of Punjab Environmental Protection (Amendment) Act 2012, Section 12; for obtaining No Objection Certificate from Environmental Protection Agency (EPA), Government of Punjab, Lahore, this Environmental Impact Assessment (EIA) Report is being submitted to the said agency. The EIA Report, as desired by [EPA], has been prepared according to the prescribed by the "Guidelines for the Preparation of Environmental Reports, 1997" and "Review of IEE/EIA Regulations, 2022." The other relevant regulations and guidelines considered while preparing this EIA report includes:

- Policy and procedures for filing, review and approval of the environmental assessments.
- Guidelines for the preparation and review of environmental reports.
- Guidelines for public participants
- Guidelines for sensitive and critical areas.
- Detailed sector guidelines.

This EIA identifies, describes and evaluates the potential environmental impacts that could result from the implementation of the project, and include possible cumulative impacts from all the activities. It also identifies required environmental permits relevant to the project. As appropriate, the affected environment and environmental consequences of the project may be described in terms of regional overview or site-specific descriptions. The Report also identifies measures to prevent or minimize environmental impacts. The report highlights existing environmental, social, physical and other aspects of the area. It also provides necessary measures to be taken to mitigate any environmental impact. The monitoring plan is also described in the report. The EIA Report describes environmental, socio- economic, physical, and environmental, land use, crops, forestry, water bodies, bio diversity and other relevant aspects associated with this project. It also describes

mitigation measures to be adopted. The EIA Report also provides information as desired under the format used to help decision makers, EPA Punjab in the present case, before issuing the desired NOC.

Scope of the study

The scope of study includes baseline survey of the proposed project, collect relevant data from primary and secondary sources, assess the impacts related to the subject project, suggest the mitigation measures to control the anticipated impacts, formulate the environmental monitoring program to check the environmental parameters at PEQS, prepare an Environmental Management plan to implement the recommended mitigation measures, consultation with the stakeholder or nearby community to know their concerns regarding the subject project

Identification of project:

According to the Punjab Environmental Protection Act 1997 (Amended 2012) and its interpretation as per Review of IEE & EIA Regulations, 2022 for filling, review and approval of environmental assessments, the present project is categorized in the category G-1 of Schedule-II for EIA, of PEPA, Regulations, 2022, requiring Environmental Impact Assessment (EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act 1997(Amended 2012).

Details of Proponent:

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Designation	Proponent
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Project Title:

The name of proposed project is M/s Star Waste Management Facility and the site of the proposed project is located at Umeed Pura Chak No 250 District Faisalabad.

Project Description:

The project mainly deals with the collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed.

Nature, size, and location of project:

Nature

The project mainly deals with the collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed.

The gas temperature in these incinerators reaches 1200±50oC rapidly and is maintained until the end of the main burn cycle. The operating temperature of primary chamber is 600- 850oC and for secondary chamber it is 850-1200±50oC

Size:

The total land area of the subject project is 8 Kanal and covered area will be 4 marls only. 2 kanal out of 8 kanals is reserved for land fill site for the disposal of waste generated from project activity. The capital cost of project is approx. 5-8 million.

Location

Project site is located at Umeed Pura Chak No 250 District Faisalabad. Site of the project is agricultural in nature and there is no human settlement within the radius of 3 km from the project site.

Surrounding of the project is as under

- Front: Road
- Right: Open agri land
- Left: Open agricultural land
- Back: Open agricultural land

Area of the project:

Total area of the project is 8 Kanal the tentative layout map is attached with file layout map showing the details of length and width of the area occupied by the Subject project

Cost of the project:

The total cost of the project is approx.5-8 million.

ECO-FRIENDLY FEATURES OF THE PROJECT

In its truest form, sustainability is a three-prong strategy involving environmental, social and economic requirements. Special feature of the project that add eco-friendly and sustainability element to its overall execution process are the absence of any sensitive or protected area within the impact zone of project site. There is no residential area near the project site. Moreover, the water requirement will be only for drinking and domestic purposes so the water consumption in the unit will not going to affect the water supply of the nearby areas. The Proponent will obtain water from the ground water table through developing a piping network for water extraction. There are no surface water bodies within the 1000m surrounding area of the proposed site. There is no reserved forest or protected area within the 1000m of the proposed site.

Need of IEE/EIA Study:

According to the section 12 of the Punjab Environmental Protection Act 2012, no Proponent of a project shall commence construction or operation unless he has filed with the Federal Agency an initial environmental examination or where the project is likely to cause an adverse environmental effect, an environmental impact assessment, and has obtained from the Federal Agency approval. Subject to the provision of this Act, Proponent must get a NOC for construction of proposed project, under section 12 of PEPA-2012 from Provincial Agency in order to start.

The Director General, EPA Punjab is the authority to issue the requisite Environmental Approval after proper review of the project. The EIA report has been prepared under the format of guidelines issued by EPA. The applicable laws for the environmental study of the project are briefly given below:

• Punjab Environment Protection Act, 2012

• National Environmental Policy, 2005

• Review of EIA and EIA Regulations, 2022

• Guidelines for Preparation and Review of Environmental Reports, 1997.

• Solid Waste Management Rules 2005

• Punjab Environmental Quality Standards 2016

• Punjab Land Use Rules 2009

Objectives of Environmental Impact Assessment

The objectives of EIA are as follows

- To access and establish the existing environmental condition of the area.
- To implement and execute environmental safeguards.
- To propose mitigation and monitoring measures that can be incorporated into the operation of the project to remove or reduce any damaging effects as far as possible.
- To prepare an EIA Report as per the relevant guidelines for submittal to the concerned EPA.

Extent of EIA Study

Following factors have been taken in the account to assess the Environmental Impacts of the proposed project:

- Environmental impacts due to land use, location, waste generation, utility services consumption and emergency spillage etc.
- Environmental impacts of physical resources i.e., soil, topography, geology, climate, air quality etc. ecological resources i.e., flora and fauna as well as health and safety of workers.
- Scoping identifies the key issues of concern at an early stage of planning process to assess range of impacts and need for EIA. Scoping is a process of interaction. Scoping identifies boundaries of the EIA study, important issues of concern

- It identifies concerns, evaluates them, organizes and presents them to assist analysis and decision making. For achieving the above objective, the study is mainly divided into the following sub tasks.
- Identification of the various legal/statutory requirements as set forth by the Punjab Environmental Protection Act, 2012 and the guidelines for preparation of EIA Reports and Review of existing regulatory framework in the country with reference to the development projects
- Collection of data related to physical, ecological and socio-economic resources of the project area
- Review the available data, drawings and report to ascertain their adequacy and need for collection of additional data
- Identification and evaluation of salient environmental impacts
- Identification of necessary mitigation measures to minimize the adverse impacts.
- Preparation of Environmental Management Plan (EMP)

METHODOLOGY FOR ENVIRONMENTAL IMPACT ASSESSMENT (EIA)

This Environmental Impact Assessment is based on methodology provided in the EPA notified guidelines for preparation of EIA report. Initially the baseline of the project area was developed by gathering secondary data, records and information on existing physical and social, and ecological environment. The primary data for the purpose of this EIA report was generated through monitoring and laboratory testing of environmental parameters. The changes expected in the critical environmental aspect's M/S Star Waste Management Facility the parameters like ambient air, noise, socioeconomic indicators that may be significant with a positive or negative attribution were identified. Subsequent mitigation, management and monitoring measures have been drafted accordingly. This EIA report presents the existing baseline situation and the environmental aspects involving Eco environmental waste management's current infrastructure for the proposed venture. The EIA study has adopted the following methodology for report compilation.

LITERATURE REVIEW/BASELINE

Exiting publications and previous IEE/EIA reports with relevance to the proposed project were studied. In addition, the legislative framework governing the process of EIA and environmental approval were reviewed to ensure that all the parameters are met. This study is based on the finding of the field visits conducted by the team.

SITE VISIT

Team members visited the location and neighborhood to perform reconnaissance survey and to gather primary baseline information with reference to environmental and social aspects. Site visits have been done with respect to environmental as well as social aspect evaluation. Questionnaires were distributed among the general public to obtain their view point regarding the proposed project.

PROJECT SPECIFIC DATA

The information related to the project and its infrastructure has been provided by the Proponent.

IMPACT IDENTIFICATION AND ASSESSMENT

A categorical assessment of environmental impacts associated with the proposed project with respect to environment and socioeconomic and ecological aspects has been conducted. M/S Star Waste Management Facility.

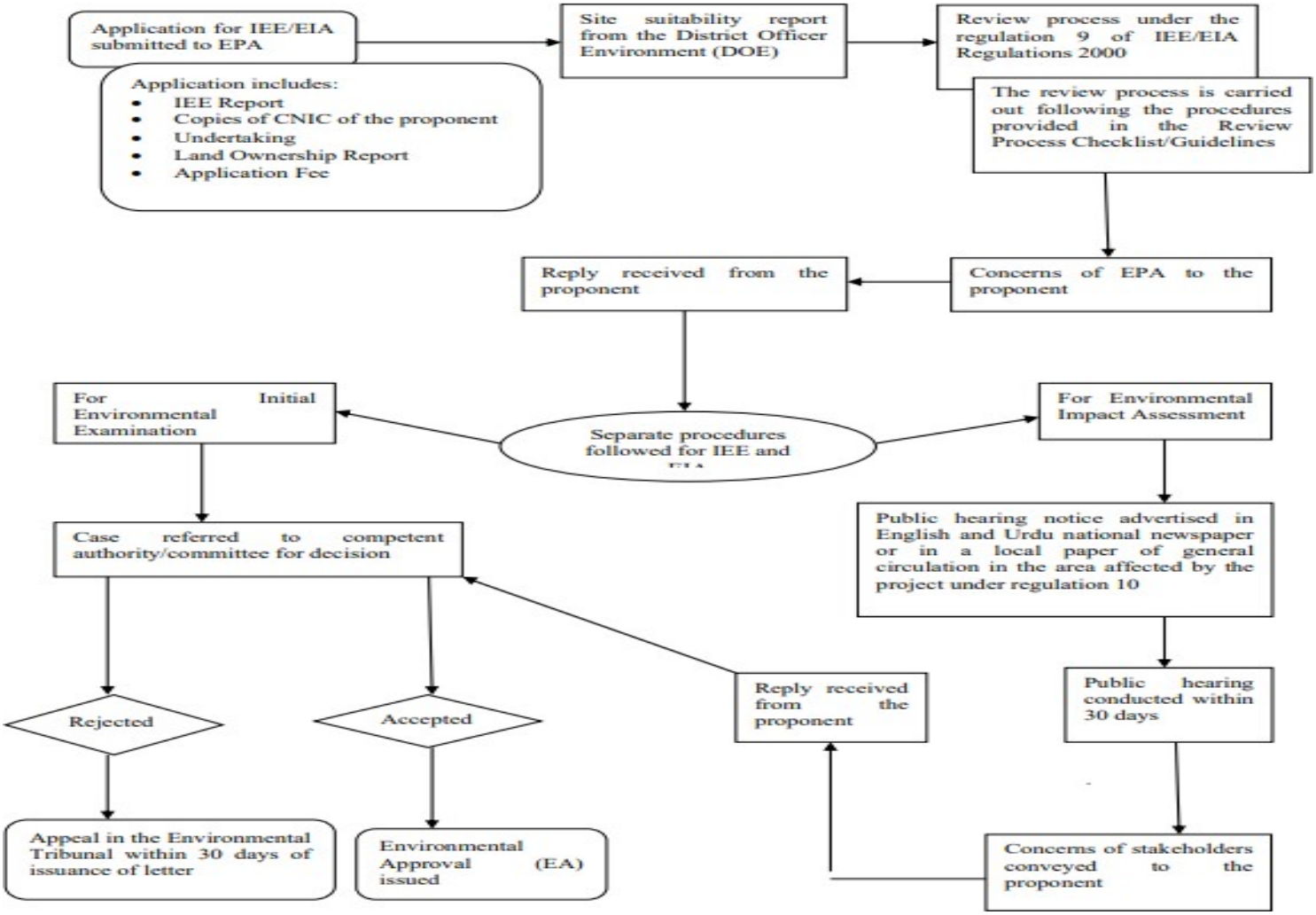
MITIGATION MEASURES AND EMMP

Impact assessment has been supplemented by the incorporating mitigation measures to lessen severity of impacts and to manage different activities within the outline of environmental management and monitoring plan. The EMMP is provided to facilitate the Proponent in establishing an environmental conscious system that supports conservation at all levels of its construction and operation.

Screening

is an essential part of an EIA process. Screening often results in a categorization of the project and from this a decision is made on whether or not a full EIA is to be carried out. The EPA Punjab has provided a layout for the screening process. Under the Regulations for Review of IEE/EIA, 2000, the EPA Punjab has provided Schedule I and II which categorize projects into IEE and EIA. For this proposed project of Star Waste Management Facility , the same Schedules were consulted. According to the Schedules the proposed project falls under Schedule II (List of projects requiring an EIA) the project falls in the G (1)

Figure 1.1: EIA Process Flowchart



Chapter# 2
ALTERNATIVE CONSIDERATIONS

To fulfill all aspects of the project under reference of this EIA Report, it is to be sited at a place where industrial processing activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012). Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements.

Obviously, environmentally sound, neat and clean environment are the other considerations for site selection. The project will also facilitate the people of the area with increasing the opportunity of employment, and other related facilities.

Keeping these requirements and their feasibility and other basic infrastructural requirements, the selected site is ideally suited for Construction of the subject proposed incinerator plant.

Site alternatives:

To fulfill all the aspects of the project under reference of this EIA Report, it is to be sited at a place where industrial processing activity is either already going on or there are bright prospects of the same. Concurrently, it must also meet the legal requirements of the Punjab Environmental Protection Act, 1997 (Amended 2012). Availability of land at the best convenient place is equally important among other considerations for the site selection. Availability of access roads, communication facilities, electricity, basic infrastructure, sewerage etc. is yet the other necessary requirements.

DESCRIPTION OF PROJECT

Type and category of project:

The project mainly deals with the collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed under the name of M/S Star Waste Management Facility and site of the proposed project is located at Umeed Pura Chak No 250 District Faisalabad . The area of project is 8 Kanal and owner of the project has taken this site on rent and rent agreement is attached with file. The aim of this project is to provide waste management facility. The subjectproject cost is 5-8 million.

According to the Punjab Environmental Protection Act 1997 (Amended 2012) and its interpretation as per Review of IEE & EIA Regulations, 2000 for filling, review and approval of environmental assessments, the present project is categorized in the category Schedule-II for EIA, of PEPA, Regulations, 2022, requiring Environmental Impact Assessment (EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act 1997(Amended 2012).

Existing Land use

The study site is situated at Umeed Pura Chak No 250 District Faisalabad . Land required for the proposed project is surrounded by agricultural lands. Land selected for the proposed projectis open, only some grasses & shrubs are present in scattered quantity.

Objectives of the Project:

An Environmental Impact assessment report is being submitted to Environmental Protection Agency for the issuance of NOC for subject project.

Present Project has following objectives;

- Provide a facility for disposal of waste

- Reduce the scale of processes so that less waste is generated.
- Proper handling and storage of industrial waste
- It is expected to benefit local industries in the subject area.
- To provide job opportunities to local public
- To improve the economic activities
- To provide better infrastructure
- Private investment will be beneficial for the national economy and GDP as well

Alternative consideration and reason for their rejection:

Location Selected:

The proposed site for M/s Star Waste Management Facility and site of the proposed project is located at Umeed Pura Chak No 250 District Faisalabad

Reason of selecting existing site:

The reasons of selection of this site are:

- lability of access roads
- Compatible land use
- Sufficient distance from major population centers
- Communication facilities
- Willing land host communities
- Availability of electricity
- Basic infrastructure
- Limited sensitive ecological issues;
- Less/few vegetation/plantation
- Less fauna species at site
- Convenient plot layout

Keeping these requirements and their feasibility and other basic infrastructural requirements at the site, the selected site is ideally suited for Installation of Incinerator facility.

Project Alternative:

Alternative sites were identified initially for the proposed project. The present site has been selected after consideration of the other alternative site. These sites and their reasons of rejection are summarized below

Reasons of Rejection

The reasons of rejection of this site are:

- No proper access road
- No proper drainage system
- Due to the ownership conflict of surrounding land
- No proper communication facility
- Fauna & Floral Species are present at this site in abundance.

Technology alternatives:

There are many alternatives to incineration of this waste stream. Alternatives include **thermal** treatment, such as microwave technologies, steam sterilization, such as autoclaving, electro pyrolysis and chemical mechanical systems, among others. But these methods cannot handle huge quantity of medical and industrial waste and demand high processing cost. The advantages of incineration are that waste volumes are reduced by an estimated of 80-95%, and the need for land and landfill space is greatly reduced. For urban areas, this can be especially important, as urban land is often at a premium.

Environmental alternative

Construction of this project this area will have minimal impact on the daily life people living in housing scheme. Chief Executive Officer is recommended to make sure that there is no any environmental impact is caused during the project construction and operations. The Chief Executive Officer will make sure all the operations will be according to EMP recommendations.

Economic Alternatives

It is installation of new incinerator It will be a source of job opportunities to local population. Toestablish the business for the Proponent. to contribute to the national economy of the country.Compensate to help eradicating poverty by providing employment.

Chapter 3

PROJECT DESCRIPTION

Type and category of project:

The project mainly deals with the collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed under the name of M/S Star Waste Management Facility and site of the proposed project is located at Umeed Pura Chak No 250 District Faisalabad . The area of project is 8 kanals.. The aim of this project is to the subject project cost is.5-8 million.

According to the Punjab Environmental Protection Act 1997 (Amended 2012) and its interpretation as per Review of IEE & EIA Regulations, 2022 for filling, review and approval of environmental assessments, the present project is categorized in the category Schedule-II for EIA, of PEPA, Regulations, 2000, requiring Environmental Impact Assessment (EIA). Further, the client is required to fulfill the legal requirements of the Section-12 of the Punjab Environment Protection Act 1997(Amended 2012).

Location and site layout of the project:

The proposed incinerator site is located at Umeed Pura Chak No 250 District Faisalabad .

Detailed project layout mapis attached with file.

Project land coordinates are as follows:

Front: Road

Right: Open plot

Left: Road

Back: Open Plot

Vegetation features of the site:

The project site has few and scattered amount of vegetation that will help to avoid land clearing, mainly shrubs, weeds and grasses are present over there in scattered quantity. The land is clear and free of dense vegetation

Magnitude of the operation including capital cost, and associated activities

This project is establishment/ installation of incinerator facility present it on open land. Projectrelated activities will be start after the environmental approval from EPD. Total land area forthe development is 8 kanals. The total cost of the subject project is about 5 million rupees while operational cost of the project with respect to environmental management will be the periodically replacement/filling of safety devices.

Schedule of Implementation:

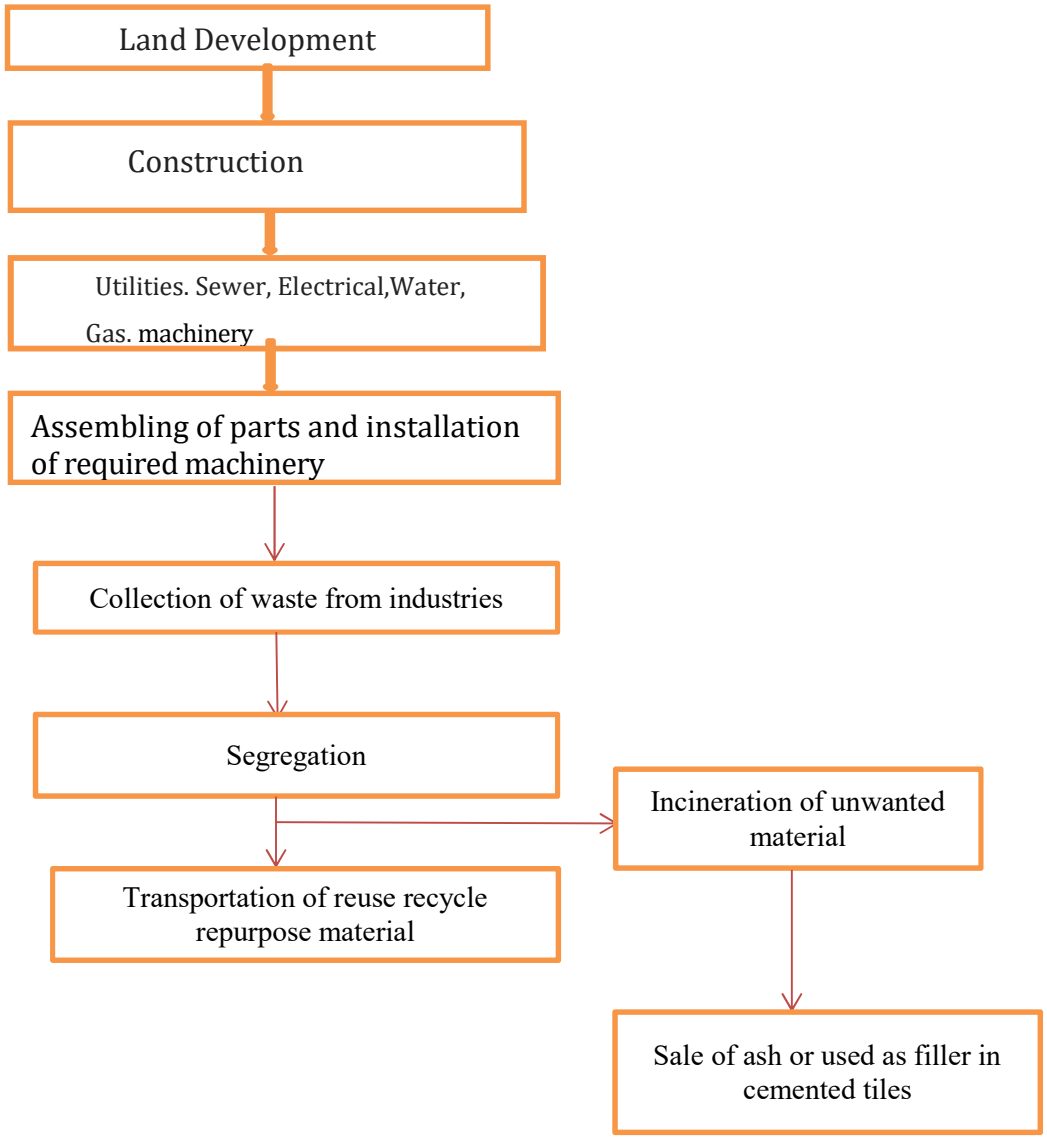
The time required for the construction of proposed project M/S Star Waste Management Facility is approximately 01 year. The work will be started as soon as the environmental approval is granted from EPA. Breakdown of the time for the construction phase is given below.

Sr. #	Activities	3 Months		3 Months			4 Months				2Months		
		4W	4W	4W	3W	5W	4W	4W	4W	4W	4W	3W	1W
1	Designing												
2	Mobilization of Contractors												
3	Lean Construction Period												
4	Peak Construction Period												
5	Restoration of Site												

Description of the project:

The project mainly deals with the collect, consign, transport, segregate, treat, dispose off, store, handle, and incinerate Non-Hazardous and Hazardous domestic, agriculture, hospital, industrial and residual waste/discarded material included solid and liquid waste. To fulfill the purpose of waste disposal incinerators of capacity 100kg/hour and 500kg/hour will be installed. under the name of M/s Star Waste Management Facility .Detailed description of this proposed project is as follow.

1- Project Process:



Technology Description of the proposed Incinerator:

Main parameters

Applicable hospital size (number of beds)	150-200 beds
Burning Ability	50-100kg/time（daily incineration 3-6 times）
Size of the incinerator	1.8m×1.4m×3.4m
Volume of incinerator	Gasification room1.2m^3,secondary burning room 0.6m^3,mixing burning room0.06m^3
Size of the filling entrance	520 ㎜×720 ㎜
Chimney	Height 10m， out-radius Ø300 ㎜
Air blower	0.5kw
Auxiliary burner	Power 0.11kw， oil consumption volume 4-10kg/h
Re-burning burner	power 0.22kw,oil consumption volume 7-14 kg/h
operation voltage	220V or380V
weight	About 6000kg

AUSW-100 Main configuration list

Equipments name	specification	qty	unit
Furnace main body（first burning room）	A3 steel、refractory material	1	set
Auxiliary burner	power 0.11kw	1	set
Re-burning burner	Power 0.22kw	1	set
secondary burning room	A3 steel、refractory material	1	set
Mixing burning room	A3 steel、resist high temperature material	1	set
gas fume purify room	A3 steel、resist high temperature material	1	set

Type of Solid Waste for incineration and Reduction

Hazardous hospital and industrial waste, will be incinerated in the proposed plant. Incineration is a high- temperature dry oxidation process that reduces organic and combustible waste to inorganic, incombustible matter and results in a very, significant reduction of waste volume and weight. Solid waste after incineration will reduce up to 75%, on each 5 KG solid waste, 1.25 KG Ash will be generated. This process is usually selected to treat wastes that cannot be recycled, reused, or disposed of

Design & Construction of Incinerator

The objective of project is to install an incinerator to promote cleaner practices and complete combustion of hospital wastes with a view to waste volume reduction and amelioration. Incinerations can minimize industrial waste at the same time minimizing impact on the environment.

1- Incinerator Capacity

Incinerators of 100kg/hour and 500 Kg/hour capacity will be installed. It consists of three chambers, which are interconnected. The primary chamber is for burning solid and liquid waste. The secondary chamber is for burning Hydrocarbons carried over from the primary chamber. The third chamber is for settling the ash and cooling of flue gases. The three chambers are constructedon steel structure with 45% Alumina Refractory bricks lining

2- Waste Feed and De-Ashing System

The feed system of incinerator would be manual (batch); the waste is typically batch-fed into a charging hopper. Residue generated after combustion will remove manually. Ash removal and cleaning is conducted through Ash doors. The doors are steel fabricated with firebrick lining from inner side.

3- Controls

The burner has provision for pre-purge, automatic sequencing, automatic ignition and flame supervision. Temperature Controller is provided to automatically maintain the temperature of the secondary chamber. In case temperature in secondary chamber rises or falls down beyond safe limit both primary and secondary burners will shut down and alarm will sound. Temperature Controller is provided in the primary chamber to cut off the burner at set temperature for fuel saving. A temperature gauge monitors the fuel temperature

4- Dust Collection

The cyclone dust collector made with S.S. casing has been provided to collect larger dust particles and Bag filters to collect fine particles to convey exhaust gases through chimney.

5- Fan

Induced Draft Fan made with S.S. impeller and SS. casing has been provided to convey exhaust gases through chimney.

6- Chimney

The chimney is 25 feet high with 3” thick brick lining up to eight feet height conveys the flue gases to the atmosphere. SS Ducts have been provided to connect incinerator with dust collector and further to connect dust collector to I.D. Fan and then to chimney

7- Incineration Principle

Most modern large incinerators operate on the ‘starved air principle, in which the waste is gasified and partially burnt using a support fuel (e.g., gas or fuel oil), in primary chamber. Gaseous phase reactions are completed in a secondary chamber and the remnant solids are then burned as completely as possible in an air rich zone, or a tertiary chamber, at the discharge end of the incinerator. The gases and airborne particulates are then subjected to complex (and often expensive) ‘clean up’ before being emitted to atmosphere. For this hazardous waste incinerator, the focus of this project is to achieve optimal emissions without the USC of sophisticated gas cleaning equipment, if costs are to be kept to a reasonable level.

Given careful design, construction and operation. However, it should be possible to achieve acceptable levels of emissions without the need for gas cleaning, by using the starved air principle. A significant proportion of industrial waste has valued as fuel, but the waste composition could be such that it might become often very difficult to achieve complete combustion using this alone. Therefore, the incinerator is designed to operate using a support fuel such as Natural Gas. The selection of a support fuel depends on its availability and the implications on operating costs

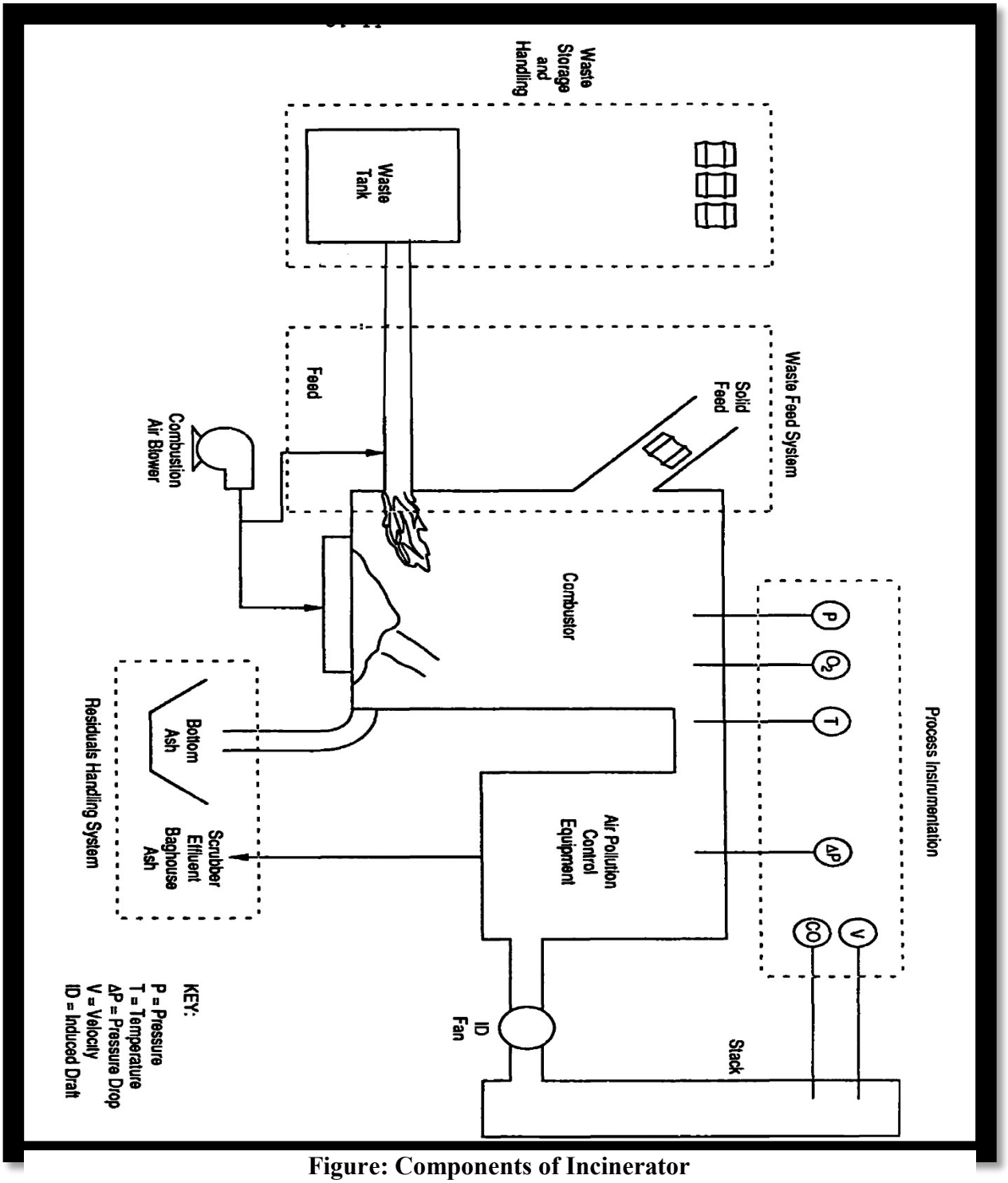


Figure: Components of Incinerator

8- Characteristics of Waste Suitable for Incineration

- Content of combustible matter above 60%
- Content of non-combustible solid below 5%
- Content of non-combustible fines below 20%

9- Waste Types not to be incinerated

The proposed Incinerator is designed to incinerate medical waste at the rate of 50 kg/hr. Incineration of materials unsuitable for incineration can result in the release of pollutants into the air. Occupational risks may be associated with the operation of certain disposal facilities.

- Pressurized gas containers
- Large amounts of reactive chemical waste
- Silver salts and photographic or radiographic wastes.
- Halogenated plastics such as polyvinyl chloride (PVC)
- The incineration of materials containing chlorine can generate dioxins and furans, which are classified as possible human carcinogens and have been associated with a range of adverse effects
- Waste with high mercury or cadmium content, such as broken thermometers, used batteries and lead-lined wooden panels
- Sealed ampoules or ampoules containing heavy metals. Incineration of heavy metals or materials with high metal contents (in particular lead, mercury and cadmium) can lead to the spread of heavy metals in the environment
- Dioxins, furans and metals are persistent and accumulate in the environment. Materials containing chlorine or metal should therefore not be incinerated

10- Factors affecting Design of Incinerator

Incineration of waste is an operation that includes feeding the furnace, burning the waste, exhausting the gases to the atmosphere, and removing the residue from the furnace. Factors, which directly influence the detailed design of the incinerator, include:

- Combustion temperatures, combustion gas residence time.
- Capital, operational and maintenance costs • Current and future quantities of waste • The waste composition and its calorific value
- The infrastructure of the area chosen for the field trials (roads, electrical power)
- Attitudes and legislation relating to emissions control
- Public concerns about incineration
- The degree to which an integrated waste management strategy has been prepared and the incinerator's role within it
- Locally available materials (refractory bricks or other insulation materials)
- Locally available manufacturing skills

11- Incinerator Operators

Incinerator operators should be trained for smooth operation of incinerator. They should be specifically trained regarding the following subjects:

- Functioning of the incinerator facility
- Health, safety and environment implications of their operations.
- Technical procedure for operation of incinerator
- The conditions which operator has to face at the site are:
    - Incinerator working at a high heat, which put the operators at a risk of burning,
    - The heat may lead to fire, carbon monoxide poisoning, etc.
    - During burning refuse may yield substances that may be hazardous or even poisonous.
    - The Operators job is physically hard and may lead to pain and other problem in hands, arms, lower back and other body parts.
    - Operators work in a noisy, hot and humid environment that may cause tiredness and general ill feeling.

Emission of Gases

Furans and Dioxins

The biggest most concern, which has caught thoughts of environmentalists about solid waste incineration, is production of a huge number of furans and dioxins. These are considered staidly injurious to health. Modern generators are equipped with special equipment to clean emission of gases from these injurious components. There was a time when no governmental regulation was there to bound incineration and save environment and atmosphere from this hazardous emission of gases but today there are strict and rigid rules and regulations to follow and conduct incineration.

Carbon dioxide

Incineration while being conducted produces a vast amount of Carbon dioxide. Carbon dioxide plays a due role in global warming, as this is the greenhouse gas. It has been observed that almost everything which has carbon in its composition is when processed by incineration evolves out as carbon dioxide.

Extra Emissions

Some other emissions of gases by waste processing are sulfur dioxide, hydrochloric acid, fine particles and heavy metals.

Solidify Outputs

Flue ash and Bottom ash is produced with the processing of waste materials and settle at the bottom of the incineration plant. The ash, which is produced, is twenty to twenty five percent of total weight of the waste processed while the flue ash makes up some ten to twenty percent of total weight of waste material. The heavy metals, which are contained in the flue or bottom ash, are lead, cadmium, zinc and copper. A small number of furans and dioxins are also produced. It is to mention here that bottom ash seldom have heavy metals in it. Flue ash is hazardous while bottom ash is not that dangerous or injurious to health.

Other issues related to Pollution:

Older models of incinerators have inconvenience that this produce odor pollution. However, in modern plants are saved from producing dust and odor pollution. They are designed to

store waste in enclosed containers along with a negative pressure to keep from odor and dirt dispersal.

Arguments supporting incinerations

- The first concern for incineration stands against its injurious effects over health due to production of furans and dioxin emission. However, the emission is controlled to greater extent by developing of modern plants and governmental regulations.
- The bottom ash after the process is completed is considered non-injurious that still is capable for being land filled and recycled.
- Fine particles are removable by processing through filters and scrubbers.
- Treating and processing medical and sewage waste produces non-injurious ash as product.

Cleaning Out Atmospheric Emissions:

Emission gases from an incinerator may involve Dioxins, Furans, carbon dioxide, sulfur dioxide, hydrochloric acid, fine particles and heavy metals. A number of processes are involved for the cleaning up of flue gas. In the proposed incinerator project, mixture of flue gas will be collected by means of Particle filtration and this filtration will be conducted through cyclone for larger dust particles collection and 8-10 bag house filters for capturing fine particles. Bag house are very effective for fine particles. The next step of the processing and cleaning of flue gas is processing of scrubbers, which are critical for the removal of hydrochloric acid, nitric acid, mercury, hydrofluoric acid, lead and residuary heavy metals. Along with cyclone and bag filters, scrubbers will be installed in incinerator for flue gases cleaning.

AIR POLLUTION CONTROL DEVICES

In built Dry Scrubber is proposed as an air pollution control system for the incinerator to be installed. Dry Scrubber is highly efficient for filtering the exhaust air from incinerator before its emission into ambient air. The detail for proposed dry scrubber is as follow:

WET SCRUBBER

Wet scrubbing systems are used to get rid of pollutants and contaminants in exhaust gas. wet scrubbers move contaminated gas through a liquid that is designed to remove pollutants. Wet scrubbers constitute a versatile and cost-effective pollution control technology that can eliminate more than 99% of airborne particulate matter.

Operation and maintenance

- Flexible design for easy expansion
- No costly chemicals required
- Virtually maintenance free
- Compact, space-saving footprint

INDUCED DRAFT FAN

An induced draft (ID) Fan is provided to

a) Maintain a negative atmosphere in the chamber.

b) Provide additional cooling air to exhaust gases.

c) Prevents an accident, when feed door is opened. This occurs due to backpressure of gases blowing out from the chamber. While opening the feed door, the radiant heat from the chamber can also be dangerous for the operators if the ID fan stops accidently.

CONTROLS

Temperatures of cooling chambers and scrubber can also be known by means of thermocouples fitted on these components. Controllers are provided to monitor the temperatures of the secondary and primary chambers. These control the whole operation of the incinerator. When secondary chamber controller show requires set temperature then the burner stops working and the primary burner starts automatically. As the temperature reaches set limit, then the burn cycle starts.

SALIENT FEATURES WASTE TYPE AND BURN RATE

It is designed specifically to incinerate all kind of hazardous and non-hazardous waste. The incinerator will have the operating capacity upto 50kg/hr

CONSTRUCTION

Mild steel welded fabrication consisting of sheet steel and structural section supports

LINING

High grade fire and insulation bricks BURNERS High-efficiency burners with electronic ignition, flame recognition and combustion control devices fitted.

FEEDING

Loading waste- Manual

ASH REMOVAL

The ash can be removed from the primary chamber manually through the ash doors. However here we use automatic system to remove ash. There is a movable grate inside the incinerator. The rotary motion of a motor is converted into linear motion of the grate through a gearbox. It is operated by means of a push button. Whenever the ash is to be removed from the incinerator it done by pushing a button. As a result, grate moves out and drops the ash down in the ash pit. The button is again pushed which brings back grate to its original position. Two 5hp motors with gearboxes are used. An automatic system comprises an electric motor, a gearbox. The gearbox is provided with output shaft. A transmission is a machine in a power transmission system, which provides controlled application of the power. Often the term transmission refers simply to the gearbox that uses gears and gear trains to provide speed and torque conversions from a rotating power source to another device.

WORKING OF INCINERATOR

'Dual chamber' systems typically work by incinerating materials in a primary chamber and then incinerating the gases inside a second combustion chamber for a second time. The resulting emissions from such a system are cleaner and more environmentally friendly.

• In primary chamber, all waste will be first loaded and incinerated, where the volatilization of waste will be achieved. The low air-to - fuel ratio in this starved-air chamber will dry and encourage the waste volatilization, and most of the carbon will be burnt over there.

• In the second chamber, the volatile gases produced in the primary chamber will be fully oxidized for complete combustion in the presence of high temperature, 100 % pure excess air and ample residence time.

• Using Dry scrubber, the gases and airborne particulates will be then subjected to complex (and often expensive) 'clean up' before being emitted into the atmosphere.

12- Safety Precautions

Every stakeholder should follow the following safety instructions:

- Read & Comply with all safety instructions.
- Never enter incinerator or loader when power is "on" or incinerator is hot.
- Always remove power (LOCK-Out/Tag out) during the maintenance.
- Make sure all guards and safety devices are in place secured and in proper operating condition before starting equipment.
- At initial burner start up make sure incinerator doors are closed and locked.
- Keep all areas around incinerator and loader clean to reduce the fire hazards for easy operator movement.
- Do not wear loose clothing around operating equipment.
- Do not incinerate explosives or highly violate materials.
- Do not overload equipment
- When opening the incinerator charging door during operation stand behind the door. A full-face shield is recommended
- Do not open ash removal door during the operation. Wait until ash has cooled to comfortable temperature
- Do not remove the cap from spark igniters without first shutting off power. Spark igniters can arc and cause electrical shock and possible severe injury.

The jobs and tasks of the operator would be:

- Activating/firing (burners)
- Adjusting air (Primary air requirement with louvers)
- Cleaning/removing (ash, debris)/ shoveling/sweeping.
- Detecting (malfunctions).
- Feeding (waste).
- Loading and unloading (waste).
- Maintaining (equipment).
- Measuring/monitoring/observing/ recording.
- Opening and closing (Incinerator doors).

- Regulating (flow, temperature).
- Turning on/off
- Design Criteria for Development

13- Staffing and Supplies

Local people will he hired for construction and operation phase of the Incinerator. It is expected that approximately 10-12 people will be required during construction phase and 2-3 people during operation phase of the incinerator. During operational phase, waste will be collected from industries through local contractors. The supplies will be transported to the project site in pickups/trucks. General supplies to be transported will include the construction material and equipment. Project personnel will travel to and from the site in smaller vehicles, mostly four-wheel drive pickups. Water during construction and operation phase will be transported to the project facilities from ground water supplies. A maximum of 1000 liters of water will be required per week during the construction phase. During operational phase the waste to be incinerated will be collected by vehicles owned by the Incinerator Facility Proponent.

Advantages of Incinerator

Consequently, whilst recycling has an important part to play, incineration frequently forms part of an overall strategy for the management of waste. Landfill will always be required for the residue, which typically amounts to about one-third of the initial mass of waste. Incineration of wastes offers the following advantages.

Volume reduction, especially for bulky solids with a high combustible content, toxic organic compounds, or biologically active materials Socio-environmental compliance, especially for fumes containing odorous compounds, carbon monoxide or other combustible materials subject to regulatory emission limitations Environmental impact mitigation, especially for organic materials that would leach from landfills or create odor nuisance Reducing atmospheric pollution caused by smoke emitted during combustion

Consumption of Water

Water consumption for the subject project will be approximately 100 gallons/day during construction activities and 50-100 gallons/day during operational phase will be used. This consumption of water will be fulfilled by underground water having depth of about 400 ft.

Waste water production will be 70-80% of the total used water that will be collected in waste water collection tank and after treatment in septic tanks, it will discharge into nearby local farmers drain. There is will be no hazardous chemical or pollutant release from the subject project during and after construction phase. Only domestic water will be drained out after treatment in septic tanks.

WATER REQUIREMENT AND WASTEWATER MANAGEMENT SOURCE OF WATER

In proposed project the water requirement in the construction and operation phase will be fulfilled by extraction of groundwater through installation of pumps.

WATER REQUIREMENT AND WASTEWATER GENERATION

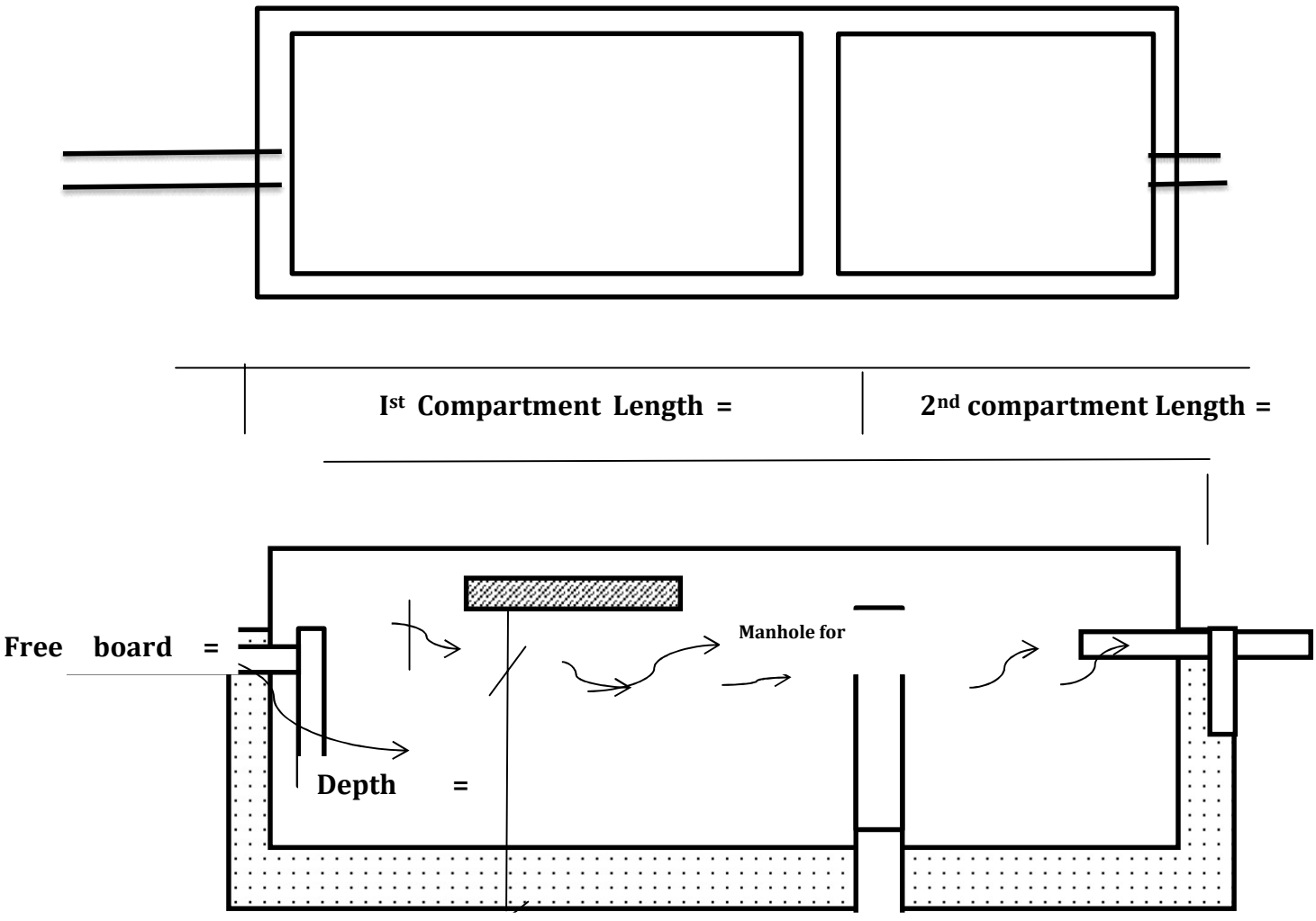
Water consumption will be only for plant cooling evaporative losses and for domestic use. Domestic wastewater will be handled through Septic Tank and will be discharged off properly. The Breakup of water requirement and wastewater generation during construction phase of project are given in Table

Waste Products of Project Process

Wastewater:

Total waste water of the project will be about 70% of the total used water which will be municipal/domestic waste water during the construction. The water discharge from the proposed plant can also be categorized as, sanitary wastewater and storm water. There is no process water in the proposed project. Wastewater channel is present near the said unit. Domestic wastewater after treatment in septic tank will be discharge into nearby Industrial drain. Proponent will get approval during operational phase for the disposal of wastewater

into industrial Drain. The design of one septic tank is given in below table, all the tanks will be design by following specifications. The tank will be properly inspected and clean otherwise accumulated sludge and scum cause the failure of tank function.



Cross sectional view of septic Tank

Solid Waste Management & Ash Disposal

Solid waste will consist of all type of solid waste including medical waste, and some general waste of Municipal nature.

1- **Solid waste collection and transport:**

Compactor vehicles will use for waste collection. Proper schedule and route will be developed and allocated for solid waste collection vehicles for collection the waste and transfer to the storage facility of plant. Vehicle will transfer the waste to storage facility with proper covering.

2- **Schedule for solid waste collection**

The waste will be collected on daily basis from specified points and waste containers will transfer the waste to the storage area.

3- **Storage of solid waste**

After collection of solid waste, it will be store in ware houses of proposed project area, having impermeable flooring, to avoid leaching of contaminant into soil. By trained workers, solid waste will feed into chambers of incinerator.

4- **Ash collection & Disposal**

After feeding solid waste into combustors of incinerator, bottom ash will be generated along with ash from cyclone and bag filters. This ash will be collected by taking appropriate measure, and handed and will be disposed off within the project premises as 1 kanal land is reserved as land fill site.

5- **Awareness plan**

All sanitary workers should undergo extensive training in SWM, including the linkage between a deteriorating environment, waste, and human health, the treatment and management of waste, occupational hazards, health and hygiene, collection and transportation procedures, and etc.

Noise

Noise generation from the project during construction phase will be due to the construction machinery, vehicles and by the sound of generator which will be controlled by adopting proper noise abating technologies. During operation phase noise will be control by constructing sound proof room for generator and providing PPEs to workers during any noise work environment.

Available Facilities

Available facilities in the project area are given below:

- Electric supply.
- Line and cellular telephone facilities.
- Labor force available for constructional and operational phase.
- Road

Health, Safety & Hygiene

Health, Safety & Hygiene includes the following:

First Aid facility

At workplace workers and employers should have enough information, knowledge and training regarding first aid treatment in case of any emergency. The subject project will provide proper medical facilities to workers and staff to cope with any incidental accidents and proper training about first aid will be provided to workers and staff.

During the construction and operation phase health, safety and environmental measures will be ensured. The health and safety plan are attached as **Annexure-E**

Safety Trainings

HSE personals will conduct monthly HSE training and drills for the emergency situation preparedness. Labors and all the staff will be provided with proper training about the work and safety practices.

Personal Protective Equipment's (PPEs)

Proper PPEs will be provided to the workers and other staff.

Types of PPEs used during construction and Operational activities

Protection	Occupational Hazards	PPEs
Head Protection	Falling objects, inadequate height clearance, and overhead power cords	Helmets with or without electrical protection

Hand protection	Hazardous material, cuts or lacerations, vibrations, extreme temperatures	Synthetic or Rubber gloves, leather, insulating material etc
Eye and face protection	Flying particles, molten metal, liquid chemicals, gases or vapors, light radiation	Glasses, shield protective, etc
Hearing protection	Noise, ultra sound	Hearing protectors like ear plugs, ear muffs
Respiratory protection	Dust, fogs, fumes, gases, smokes, vapors, oxygen deficiency	Facemasks or air supply
Body protection	Extreme temperatures, hazardous materials, biological agents, cutting and laceration	Aprons, insulating clothing etc of appropriate materials

Restoration & Rehabilitation Plan:

The proposed site for incinerator is located at Umeed Pura Chak No 250 District Faisalabad It is un- populated area with no any human settlement more than 3 kilometers and also there is no chance of human population displacement to acquire the land. The site of the proposed project seems to have no visual impact on historical, archeological, and cultural resources and on landscapes, as the site does not fall near or in the boundaries of the protected areas. The project area is uninhabited. Hence resettlement and rehabilitation requirements are nonexistent

Plantation:

There is very low vegetation in project area. Native plants will be planted by Proponent for the aesthetic beauty and conservation of the plants.

Government approvals:

The project Chief Executive Officer will get all relevant approvals from the government departments after getting Environmental approval.

Chapter # 4

PROJECT ENVIRONMENT

GENERAL

An environmental baseline study is intended to establish a database against which potential project impacts can be predicted and managed later. The EIA of the proposed project covers a comprehensive description of the project area, including the resources which are expected to be affected by the project, as well as, those which are not expected to be directly affected by the construction and operation of the project. The existing environmental conditions around the proposed project have been considered with respect to physical, biological and socio-economic aspects. Site visits were conducted to survey the field area and to collect environmental data on physical, biological and socio-economic parameters. Consultations were held with the general public and stakeholders of the project area in order to seek the public opinion on the implementation of the proposed project.

Study parameters:

The existing information to establish a database for the EIA of the project was collected from different government departments; review of previous studies and through the site visits carried out in the project area.

The Social Assessment of the project area was conducted through consultation with the community by interviewing them. Assessment of the area has been carried out distinguishing it into**:**

Study Area:

The existing information to establish a database for the EIA of the project was collected from different government departments; review of previous studies and through the site visits carried out in the project area.

The Social Assessment of the project area was conducted through consultation with the community by interviewing them. Assessment of the area has been carried out distinguishing it into:

DESCRIPTION OF ENVIRONMENT

Physical Environments

Natural Habitats

The project site is situated in the rural area of District Faisalabad. Therefore, some natural habitats arefound in the area.

Land Resources

Topography

The proposed site is located in the plain area. Agricultural fields and roads are the main topographic features. Elevation of the area is about 186 m over sea level.

Geology

The area comprises unconsolidated alluvium deposited over recent geologic times.

Climate

Summer season prevails from April to September with June being the hottest month. Summer months have means maximum and minimum temperatures as 40.4°C and 27.3°C respectively. Winter months are from November to March and January is the coldest month. Table shows the climatic data.

Serial	Month	Mean Temperature (°C)		Precipitation (mm)	Relative Humidity (%)
		Max	Min		
1	January	19.8	5.9	23.0	64.6
2	February	22.0	8.9	28.5	57.6

3	March	27.1	14.0	41.2	51.1
4	April	33.9	19.6	19.7	37.9
5	May	38.6	23.7	22.4	31.9
6	June	40.4	27.3	36.3	39.8
7	July	36.1	26.8	202.1	63.3
8	August	35.0	26.4	163.9	68.8
9	September	35.0	24.4	61.1	59.6
10	October	32.9	18.2	12.4	53.2
11	November	27.4	11.6	4.2	61.4
12	December	21.6	6.8	13.9	67.8
13	Annual	30.8	17.8	628.7	54.7

Source: Data Processing Centre, Pakistan Meteorological Department

Rain fall

Monsoon rains mostly occur in July and August. Winter rains fall in January and February.

Wind

Wind blows from North-West and South-East during winter and summer season respectively. Moderate intensity wind storms occur in months of April to July. During June their frequency increases because of development of low pressures. 60% days of the year are calm and 33% days have mean speed of 1-3 knots. Only 6% day's

exhibit speed of 4-6 knots and higher.

Ecological Environments

Flora

The project site is devoid of any significant natural vegetation. Common trees found in the area are Shisham, Mulberry, Neem and Dhrek. In the rakh areas trees like Kikar, Phulahi, Jand, Khaggal, Van, Farash and Beri are found in small numbers.

Fauna

The wildlife is scant in the area. Pig and hares are fairly common. Block and gray partridges are also found.

Rare/Endangered Species

No rare/endangered species of plants and animals are found in the project area.

Socio-Economic Environments

Population of District Faisalabad

Faisalabad District is one of the districts of Punjab province, Pakistan. According to the 1998 census of Pakistan it had a population of 3,029,547 of which almost 42% were in Faisalabad City. It is the third largest city of Pakistan after Karachi and Lahore.

Land Use

The project site is open plot with in the boundary wall to secure the area.

Occupational Safety

Security

The local people do not involve in heinous crimes. The project area is safe for installation of incinerator. District Jhang have its integral security system which is functional round the clock. The area is safe to operate.

Social Cohesion/Attitude

Most of the follows the family system of society. People live in joint family system. Their attitude is positive for the present project.

Food/Nutrition

Agriculture is largely irrigated. Thus people are well nourished.

Health

District Headquarter Hospital Faisalabad, Allied Hospital, THQ Hospitals and many private hospitals are present within the district has specialist's facilities.. Doctor said mostly people are healthy and source of their income is agriculture and labor in the factories.

Education

There are many private and government schools, colleges and universities in district Faisalabad**.**

- Punjab Group of Colleges (Girls Campus) Service Road
- Punjab Group of Colleges (Boys Campus) Service Road
- Government College University Faisalabad
- University of Agriculture, Faisalabad

Economic

Income Levels

Generally, the people enjoy moderate income levels. With increasing job opportunities income levels are steadily rising.

Local Occupations and Employment

Most of the locals are agriculturists/farmers. Small percentage is serving in Government Department rate of District Faisalabad is about 14.6 %.

Electric Supply

WAPDA's electric supply is provided at the site. FESO also provide electricity to the district.

Institutional Activities / Effectiveness

There are a few public / private institutions and NGOs operating in the project area.

Communication Network

Project site is well linked with okara, Pindi Bhatian and other cities.

Agriculture

Irrigation is done by canal and tube well. All Rabi and Kharif crops are sown.

Quality of Life

People lead simple life. Activities of women are mostly restricted to homes.

Civic Amenities

Civic amenities like potable drinking water, dispensary and rest area are available at the project site.

Cultural Heritage

The area does not boast of any significant cultural development.

Welfare of Employees

Management of project is mindful of the fact that the satisfied employees will deliver better output.

Community Support

Proponent will take interest in welfare of the local people. They will support certain community project

Aesthetic Values:

Like the general trend among the citizens of area, most of the people have low awareness about environment. Even then, some people take cleanliness and neatness of the environment lightly. Some people throw municipal solid wastes (MSWs) on the streets. Sense of personal responsibility to keep the environment clean as good citizens is even now lacking among a few people. Environmental Projection Department Jhang active and working for the environmental awareness among the citizens of district Jhang. Team visit the office of the district office of Environment protection Jhng for the collection if secondary data. A meeting with the DO Environment and Respective inspector was proof

helpful in the reportwriting.

Archaeological and Historical Treasures:

Archaeological or historical treasures within the project area are not available.

Chapter # 5

SCREENING OF POTENTIAL ENVIRONMENTAL IMPACTS & THEIR MITIGATION MEASURES

The following chapter describes the overall possible impacts of project on the physical, biological and socioeconomic environment because of construction and operation phases and mitigation measures to minimize the significance of the possible impacts up to an acceptable level.

Methodology of Impact Evaluation:

The methodology adopted for impact evaluation includes the Project Impact Evaluation Matrix.

Project Impacts evaluation Matrix:

The impact Evaluation matrix was developed by placing project activities on x-axis and different environmental parameters likely to be affected by the proposed project actions grouped into categories i.e. Physical, Biological and Socio Economic Environment. For the impact assessment, project impact assessment matrix is used for the construction and operation phase. A project impact evaluation matrix is attached in next section of this chapter.

Checklist has been used to identify the impacts during construction and operation phase while the evaluation of impacts has been carried out on the basis of developing matrix, in which impacts have been rated on the basis of their significance. For rating impacts significance following criterion has been developed;

NA – Not Available
LA – Low Adverse (Short term, reversible or less damage to environment)
MA- Medium Adverse (Long term reversible damage to environment)
HA – High Adverse (severe irreversible adverse damage to the environment)
LB – Low Beneficial (Short term benefits or less beneficial to the environment)
MB – Medium Beneficial (Long term benefits to environment)
HB – High Beneficial (Continuous benefits to environment)

	Physical Environment							Biological Environment		Socio-Economic Environment							
Environmental Component / Project Activities	Topography &	Soil Quality	Landscape	Surface	Ground water	Air quality	Noise	Flora	Fauna	Agricultura	Health & Safety	Disruption of Public	Employmen	Population Disturbance	Social Disorder	Cultural Values	Traffic Managemen
Transportation Activities	LA	LA	LA	MA	O	MA	MA	LA	MA	O	LA	LA	HB	MA	LA	LA	LA
Earth Work	LA	LA	MA	LA	LA	MA	MA	LA	LA	O	HA	HA	HB	LA	O	O	LA
Construction Activities	LA	LA	MA	LA	LA	MA	MA	LA	LA	O	HA	HA	B	LA	O	O	LA
Operation of generators	O	O	O	O	LA	HA	MA	O	O	O	HA	LA	HB	O	O	O	O
Operation Phase	O	O	O	O	O	O	MA	O	O	O	LA	O	HB	LA	O	O	O
Water consumption	LA	O	LA	MA	MA	O	O	LA	LA	LA	LA	HA	B	LA	O	O	O
Wastewater generation	MA	LA	MA	MA	MA	MA	O	MA	MA	MA	LA	LA	B	LA	LA	O	O
Storage of Waste materials	LA	LA	O	LA	MA	LA	O	O	O	LA	HA	LA	B	O	O	O	LA

Public welfare	O	O	B	B	B	B	O	B	B	HB	HB	HB	HB	HB	HB	HB	LB
Economic activities	LB	O	B	B	B	B	B	B	B	B	HB	B	B	B	B	B	LB
Employment	O	O	O	O	O	O	O	O	O	O	B	B	HB	B	B	B	LB
Infrastructure improvement	LB	MB	HB	B	B	B	B	HB	LB	HB	HB	B	HB	B	B	B	B

Legend:

O=Negligible/No impacts B=Beneficial LA=Low Adverse MA=Medium Adverse

HA=High The following chapter describes the overall possible impacts of project on the physical, biological and socioeconomic environment because of operation phases and mitigation measures to minimize the significance of the possible impacts up to an acceptable level. The anticipated impacts related to location, design, construction and operation of the proposed project have been assessed and mitigation measures have been suggested in this report.

Mitigation measures to reduce the impacts on geology, topography, water resources and soil are as follow:

Impacts Analysis and prediction:

In order to give correct categorization to the present project Rapid Environmental Assessment Procedure was followed. It revealed that there are no major adverse impacts of the project although it has many positive impacts on local public and economy. Only a few and moderate/minor impacts are projected.

Screening:

It is the first step of the environmental study. It identifies the factors that may influence the project environments. Level of the assessment is also determined.

Characterization:

Categorization of the project is done as per Pak EPA, Review of IEE and EIA Regulations, 2000. Accordingly, the project falls in Schedule-II for which an EIA level study is needed.

Meetings:

For the impact analysis and predictions detailed meetings were held with local government officials, management of M/s Star Waste Management Facility and Local peoples. Issues were discussed that may affect the environment at any stage. All possible mitigation measures were considered and incorporated in the Environmental Management Plan.

Consultation

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders, shopkeepers and workers in the area. These included local government departments, NGOs, public representatives and local residents.

Concerns of stakeholder:

During these discussions the participants gave their candid views about the environmental issues and their potential impacts. There was unanimous positive view about the project. However, they opinioned that mitigating measures can be minimized the environmental degradation and ward off an untoward incident/accident. Some of their main concerns are given below:

- The locals should be consulted during every phase of the project.
- Maximum employment should be provided to local area/
- Health facilities would be provided to the workers of the project.
- The project would not cause environmental degradation in any shape
- Workers would have job security during operational phase.

Mitigation and Impact Assessment Criteria:

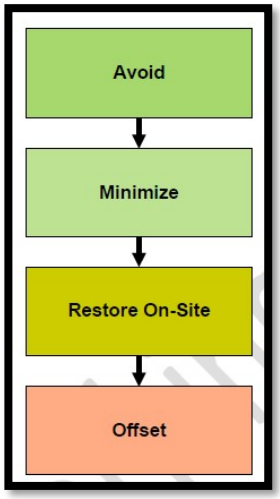
Impact assessment criteria:

The impacts were assessed in the light of criteria given as under: -

- Magnitude or degree of impact
- Time and duration of impact
- Likelihood of impact occurrence
- Sensitivity of impact
- Risk related to impact

Mitigation assessment criteria:

The Mitigation Hierarchy establishes a structure to guide development and application of measures to mitigate impacts on environmental values and associated components. The term "mitigation" applies to four steps, or levels, in the mitigation hierarchy.



General principles

1. Maintaining the integrity and natural functions and processes of ecosystems, and the resilience of ecosystems, is prerequisite to sustainable use of natural resources, and essential to maintaining ecosystem goods and services over time.
2. The mitigation hierarchy is applied in order of priority as follows:
    a. Avoid
    b. Minimize
    c. Restore On-Site
    d. Offset (Off-Site or On-Site)
3. Generally, the "higher" the priority of the environmental value and associated component, the more protective the mitigation measures.
4. For an action or measure to be considered "mitigation", a party must accept responsibility for implementation of appropriate mitigation measures, and there must be certainty that the mitigation measures will be carried out.
5. Implementing mitigation measures can help resolve issues that may delay or prevent a proposed project or activity.

General considerations

1. Which environmental values and associated components will be impacted by the proposed project or activity? (This will be determined from the output of the environmental impact assessment, i.e., the Environmental Impact Assessment and Mitigation Plan)
2. Have mitigation measures for impacts on environmental values and associated components, at all scales, been considered?
3. What is the current condition of each environmental value and associated component actually present within the footprint and area of influence of the proposed project or activity?

4. Can impacts on one or more environmental values or associated components be more fully mitigated than impacts on other environmental values and associated components?
5. Are there multiple environmental values and associated components with conflicting management needs and potential conflicts that need to be considered?
6. Is sound guidance available and being used, e.g., are best management practices (BMPs) and guidelines available for affected environmental values and associated components?
7. Is there opportunity to collaborate with other proponent that may have interest in overlapping mitigation measures?

The environmental issues have been identified during literature review, consultation with stakeholders, relevant reports and visits to project site. Various types of environmental issues likely to crop up during the life cycle of project are grouped in the following stages:

- Project location
- Project design
- Construction stage
- Operation stage

Environmental Parameters:

Environmental Impacts due to project location:

Project is present in the industrial cum agriculture area of the District Jhang. Many other industrial units are also present near by the project area. The project is proposed Installation of incinerator; the site does not fall in the category of sensitive area and no environmentally sensitive localities exist within radius of study area. Access road network is available at the project site. If the project Proponent maintain HSE conditions and comply with the PEQS limits than, there will not be any significant impacts of the project on the environment.

If the mitigation measures are effectively implemented, the residual impact of the Subject project activities on the area's geophysical environment is expected to be insignificant.

Impact significance: Low to moderate
Nature of impact: Direct
Duration: Long-term
Timing: Construction & Operation phase
Reversibility: NA
Likelihood: Low
Consequences: Mild or may be positive

Mitigation Measures

- Project site will have good and efficient road infrastructure that already exists there at the project site.
- Location can be considered as the positive impacts due to enhanced infrastructure.
- The project will also have positive socioeconomic impacts because of provision of jobs to the local residents of the area.
- No human settlement within the radius of the study area
- There would be no issue of congestion of traffic due to presence of good road network in the area.

Environmental Impacts due to the project design

Subject project is proposed installation of incinerator under the name of M/s Star Waste Management Facility. Storage & handling of solid waste, waste water treatment facility and solid waste management and area of parking will be reserved within project site. Firefighting plan, health & safety plan, tree plantation plan, emergency response plan will be incorporated during the design phase of theproject.

Following are the major Environmental impacts due to the development related to the design:

- Structural stability of the proposed project.
- Soil structure and soil bearing capacity
- Road infrastructure design
- Emergency exit in the proposed project
- Firefighting system
- Wastewater disposal system design
- Rain water harvesting capacity of the drainage system

- Electricity hazards

Impact significance: moderate to high
Nature of impact: direct
Duration: Long-term
Timing: Constructional phase & Operation phase
Reversibility: NA
Likelihood: moderate to high
Consequences: moderate to high

Mitigation measures and recommendations

Following are the mitigation measures and recommendations to minimize the anticipated impacts:

- Each industrial unit will incorporate all HSE measures regarding the design of project.
- Structure stability of the building should be ensured.
- Emergency exist points should be marked within the project building.
- Firefighting system should be designed for the emergency situations.
- Electricity system should be design safe and sound.
- Electricity wires should be covered by thick plastic/electricity resistant covers.

Environmental Impacts during construction:

Impacts related to the construction phase of the subject project are discussed below:

Impacts on the Physical Environment

- **Grubbing and stripping**

Grubbing and stripping may be a minor and short-term impact on the physical environment during the construction phase. It may also be a health and safety hazard for the people at or near the project site.

- **Leveling and compaction of the land**

Leveling and compaction of the land is also a short term and minor impact on the physical environment and it may also be a health and safety hazard for the workers.

- **Demarcation of project building and other facilities**

It may also be a minor impact on the physical environment due to the subject project.

- **Generation of dust during loading and unloading of construction materials**

It is also a minor and short-term impact on the physical environment and also for health and safety, which may arise during the construction phase.

- **Generation of noise on account of vehicular use and construction activities**

It is also a minor and short-term impact on the physical environment and also for health and safety, which may arise during the construction phase.

- **Gaseous emission due to the vehicles**

It may also be a minor impact on the physical environment during the construction phase, if vehicles are not properly tuned.

- **Safety of construction workers, people in the surroundings and passersby**

Health and safety issues may arise during the construction phase if proper precautionary measures will not be taken.

- **Any outbreak of fire due to electrical and other failures**

This issue may arise due to carelessness or improper management, and it may be a serious hazard which may affect the environment or may also cause the loss of property or life.

- **Solid waste generation due to domestic and construction activities**

Solid waste generation due to domestic and construction activities may be a negative impact on environment if not managed properly.

- **Wastewater generation from the domestic and constructional activities**

Wastewater generation due to domestic and construction activities may be a negative impact on environment if proper wastewater treatment and management system will not be implemented.

- **Ground water quality**

Ground water quality may be affected by the development if proper mitigation measures will not be implemented.

- **Impacts on Fauna and Flora**

Construction will impact the flora/ vegetative cover and fauna present at the project site.

- **Security threat**

Security issue is a major socioeconomic impact which may arose during the construction phase.

- **Impact on land value**

Construction of the subject project may cause positive or negative impact on the land value.

- **Dislocation of the people**

Construction of the subject project may cause the dislocation of the local people if any, which is a negative impact on the socioeconomic environment.

- **Loss of public and private infrastructure**

Construction of the subject project may cause loss of public and private infrastructure if any, which is also a negative impact on the socioeconomic environment.

Mitigation Measures and Recommendations

- Precautionary measures should be adopted to save the environment from the impacts of grubbing, stripping, leveling and compaction and health and safety of workers should be ensured during the construction phase.
- Demarcation of the project building and other facilities should be according to the laws and regulations.
- Sprinkling of water on dusty tracks is recommended to avoid the generation of dust on dusty tracks.
- Vehicles should be properly tuned to reduce the impacts of dust and noise.
- Proper mitigation measures should be taken to reduce the noise generation during the construction activities.
- PPEs i.e. ear muffs, helmets and masks etc. should be provided to workers to ensure their health and safety during the construction activities.
- Precautionary measures should be taken to reduce the local flooding due to over-use or leakage of pipes.
- Health and safety of construction workers, people in the surroundings and passersby must be ensured.
- Precautionary measures should be taken to avoid any outbreak of fire due to electrical and other failures.
- Constructional waste should be used for landfilling purposes.
- Domestic solid waste should be kept in dust bins and should be handed over to local contractors.

- Wastewater treatment facility (septic Tank) should be incorporated in the design of the project to treat the wastewater produced due to constructional and domestic activities before the final disposal.
- Add more vegetation to restore the land by more plantations.
- Essential services like water supply, sewerage disposal and solid waste management must be in working condition.
- Construction timings should be scheduled to cause minimum disturbance to neighbors.
- Because of presence of security guards round the clock the security at the project site will be improved as well as in its vicinity. Impact will be moderate positive.
- Land value in the surrounding area will increase due to completion of the present project. Impact will be moderate positive.
- The project does not involve dislocation of the people. There is no requirement of resettling a single person. Impact is nil.
- No movable or immovable property and infrastructure of public and private sectors will be lost or damaged during construction and operation stages. Impact will be nil.

Impact on Soil and Geology

Project activities including excavation, cut and fill operations, removal of trees and green cover vegetation etc., will enhance the soil erosion during the rainy season. Removal of trees and green cover vegetation will reduce infiltration rate of rainwater. The impact on soils will be due to the soil erosion at the tower construction site and along the access routes. Excavation activity and land clearance in the erosion prone areas have to be minimized while conducting site selection for towers. Leveling and stabilization of tower construction sites will be done after completion of construction activity which will avoid surface runoff and damage to the topsoil.

Mitigation Measures:

The impact associated with landslides due to excessive erosion and other civil works can be avoided or minimized by following mitigation measures:

- Maximum effort should be taken to minimize removal of trees and green cover vegetation.

- Minimize obstruction or destruction to natural drainage pattern of the surrounding area.
- Proper treatment of clearing and filling areas against flow acceleration
- Turfing work should be taken prior to rainy season around the Grid station.
- Contractors shall restrict cut and fill operation around sharp/deep slope areas.
- Top soil (2-3 cm from the top of the soil), which is removed during construction from the cultivated lands must be stored separately for future utilization of cultivated lands near tower leg locations.

Land Degradation

Most of the building materials such as stones, aggregates, and sand required for construction of the proposed project will be obtained from the quarry sites. Since substantial quantities of these materials will be required for construction of the development, the availability and sustainability of land resources at the extraction sites will be negatively affected as they are not renewable in the short term.

In addition, the sites from which the materials will be extracted may be significantly affected in several ways including landscape changes, vegetation, poor visual quality and opening of depressions on the surface leading to several human and animal health and safety risks. Similarly, during construction of the proposed project a lot of solid waste will be generated. These include papers used for packing cement, plastics, timber remains, landscape and land clearing debris, asphalt pavement, gravel and aggregate products, concrete, masonry scrap and rubble (brick, concrete masonry, stone) among others. These will have an implication on dump environment. It is expected that the contractor will obtain materials for construction purposes from licensed suppliers or from authorized areas.

Most of the construction waste will be used is land filling and pavement of road. The extent of this impact is localized with a low intensity. It is likely that the impact may occur. The impact can be highly improved/eliminated with mitigation. Therefore, the impact is negative and of low significance.

Air Pollution

Air pollution is quite likely to occur during construction phase. This is due traffic and other equipment using fossil fuels that release hydrocarbons and other gases including carbon dioxide,

nitrous oxides, Sulphur oxides, and particulate matters which may pollute the air. Likewise, activities like land clearing, vehicle movement, excavations for building foundations, construction drive ways and landscaping may generate dust especially during the dry season.

Mitigation Measures

Sprinkling of water during excavation will reduce the dust emission to a great extent.

The operation of transmission line and the Grid station will not have any negative impact on the air quality of the region.

Surface Water Pollution

The construction and operation of the transmission lines will not have any significant impact on the surface water quality in the area since no surface water body was found. Proposed activities will create temporary impacts to the existing drainage system in the area. Stagnation of water will also create temporary breeding sites to mosquitoes, which will have direct impact on public health.

Mitigation Measures:

Ensure that minimum water is lost during construction activities and no water remains stagnant at any place.

Impact on Ground Water Quality

Ground water contamination might take place during construction activities. In case of an accidental spill or maintenance works of vehicles, machineries and different components of the transmission line and grid station; chemical substances and oily wastes, which are often used in the construction vehicles and machineries, may leach into the soil and percolate to the ground water. In rainy seasons, the quality of soil is vulnerable since the porosity increase and leachate formation is escalated which may eventually bring an impact on the ground water resources.

Impacts on Biological Environment

Impacts on Flora

As there was very less vegetation present on the project site, there will be very less impact on flora. No special plant species of international conservation importance was recorded at proposed site. The impacts are therefore considered of very low significance.

Impacts on Fauna

The nature of the site has not attracted several organisms to find refuge in the area although some including different types of birds, reptiles, amphibians and invertebrates are found. The clearance of vegetation and presence of noisy machinery, trucks and workforce will create unfavorable environment for most of these organisms while crawling organisms will eventually vanish following construction of paved surface.

However, the temporary nature of the construction activities will result in impacts of short-term duration and therefore the impact is considered of low significance.

Impacts on Socioeconomic Environment

Workers Accidents and Hazards during Construction

Construction workers are prone to accidents resulting from construction activities. These accidents may have acute or chronic impacts depending on nature, severity and intensity. In this regard, construction and mobilization activities of the proposed unit could result into accidental injuries and hazards, etc. which could negatively impact the workforce.

Because of the intensive engineering and construction activities including erection and fastening of roofing materials, metal grinding and cutting, concrete work, steel erection and welding among others, construction workers will be exposed to risks of accidents and injuries. At times, such injuries may be from accidental falls from high elevations, injuries from hand tools and construction equipment cuts from sharp edges of metal sheets and collapse of building sections among others.

Vibration and Noise

The level of noise and vibration are likely to increase during the construction phase. The noise will be mainly come from vehicles and equipment operation during construction activities as well as people working on the project construction. This is a short-term impact and it will be felt mostly around construction sites and its peripherals.

There will be no drilling activities or involvement of heavy or high noise machinery. For residential areas located within 20km from the Project site boundary, it is predicted that the construction phase and operation of the proposed project will not pose any significant and the annoyance level is within the “no to little” impact category.

Considering technological advancement in construction industry, it is anticipated that machinery and equipment to be used during construction will be modern, versatile, and quieter than the old ones. It is also likely that they will require fewer numbers of operators reducing noise from workers. Therefore, the levels of noise and vibrations are anticipated to be within the tolerable limits, short term and localized. In view of the above and the fact that construction will concentrate on non-residential area, no significant impact is anticipated and the impact can be highly mitigated.

Employment Opportunities

On the other hand, the proposed project will have, during construction phase, potential positive impact to the local community through provision of employment. It is expected that maximum people will be employed during construction phase. Employment will be in form of managers, skilled labors as well as unskilled laborers. Therefore, apart from employment benefits occurring to local people other national and international experts are likely to be employed by the project especially at senior positions.

Income Generation among Suppliers

During construction phase, the proposed project plan to source most construction materials from local and/or national sources including cement, iron sheets, steel bars, pipes, etc. from local shops. This demand therefore, will create market for local people and/or elsewhere in the country engaged in supplying construction materials leading to significant positive economic benefits to suppliers on short term basis.

Impacts on Security

The impacts on the area's security are considered to be insignificant. As the site is associated with an already existing its security will be ensured by the management through security checks/screening of workers and their guests and 24 hours security watch by expert security men to prevent such criminal activities from happening at the site.

Mitigation Measures

Protection of Flora

In order to protect plant species from potential negative impacts, the Proponent shall ensure that:

- The contractor is responsible for informing all employees about the need to prevent any harmful effects on natural vegetation on or around the construction site as a result of their activities;
- Unnecessary removal, damage and disturbance of natural vegetation will be prohibited;
- Re-vegetation of the proposed project site will be undertaken;
- Indigenous trees will be planted around project area to enhance natural habitat.
- Prepare a tree cutting and replanting plan to avoid indiscriminate tree-cutting. The plan shall clearly define areas where vegetation removal is necessary based on Project requirements and shall have provisions for replanting to compensate for lost trees.

Land Degradation and Soil Erosion Control

Potential negative impacts on land and soils shall be mitigated by ensuring that:

- The contractor implements erosion control measures as an on-going exercise;
- During construction, the contractor protects all areas susceptible to erosion by installing necessary temporary and permanent drainage works as soon as possible and by taking any other measures necessary to prevent storm water from concentrating in streams and scouring slopes, banks, etc.;
- Any tunnels or erosion channels developed during the construction or maintenance period are backfilled and compacted and the areas restored to a proper condition;
- Areas where construction activities have been completed and where no further disturbance would take place are rehabilitated through re-vegetation;
- Ground clearance is minimized and if possible concentrated only to the specific building foundation areas, and only when it is necessary;
- Prompt reclamation of exposed soils is done;
- Construction during long rains period should be done with caution to avoid soil from being washed away;
- Topsoil excavated from buildings foundations is stored for re use on other areas like rehabilitations of quarries

Soil and Water Pollution Measures

Measures to mitigate soil and water pollution impacts during construction phase shall ensure that:

- Concrete mixing directly on the ground is prohibited and only be undertaken on impermeable surfaces;
- Concrete batching activities are located in an area of low environmental sensitivity;
- All runoff from batching areas is strictly controlled, cement-contaminated water is collected, stored and disposed of at an approved site;
- Contaminated water storage facilities are not left to overflow and appropriate protection from rain and flooding are implemented;
- Unused cement bags are stored out of the rain where runoff won't affect it;
- Used (empty) cement bags are; collected, stored in weatherproof containers to prevent windblown cement dust and water contamination, not to be used for any other purpose and shall be disposed of on a regular basis via the solid waste management system;
- All excess concrete is removed from site upon completion of concrete works and disposed of whilst preventing washing of the excess concrete into the ground;
- Entrance or accidental spillage, of solid matters, contaminants, debris and other pollutants and wastes into surface and ground water is prevented;
- Awareness of employees and workers on protection of environment in their daily duties is promoted
- Standing water will not be allowed to accumulate in the temporary drainage facilities or along the roadside to prevent proliferation of mosquitoes.
- All excess aggregate is removed from site and properly disposed of.

Waste Management

To ensure that solid waste is properly managed and potential negative impacts are mitigated, following mitigation measures should be taken.

- As the existing facility is maintained in a neat and tidy condition. Measures to reduce the negligent behavior with regard to the disposal of all refuse are taken, bins, containers and refuse collection facilities for later disposal are provided at all places of work so the same practices must be carried out for denim plant.
- Solid waste may be temporarily stored on site in a designated area prior to collection and disposal.

- Waste storage containers on the construction site should be covered, tip-proof, weatherproof and scavenger proof.
- No burning, on-site burying or dumping of waste shall occur.
- Inert construction rubble and waste materials should be disposed of by burying in the borrow pits or at designated site.
- Metal refuse bins or equivalent plastic refuse bins, all with lids should be provided at construction site.
- Domestic refuse is collected and removed regularly from existing facility and transported to the approved refuse disposal site in covered containers or trucks so same will be done for denim plant
- Segregation of wastes shall be observed. Cleared foliage, shrubs and grasses can be given to local farmers for fodder and fuel. Organic (biodegradables) shall be collected and disposed of on site by composting (no burning on site)
- Residual and hazardous wastes shall be disposed of in disposal sites approved by local authorities
- Construction/workers' camps shall be provided with garbage bins
- Burning of construction and domestic wastes shall be prohibited.
- Solid waste generated during construction and to be treated and safely and handover the local contractors for reuse land filling and leveling
- Used oil, lubricants, cleaning materials, etc. from the maintenance of vehicles and machinery should be collected in holding tanks and sent back to the supplier;
- Runoff from fuel depots / workshops / machinery washing areas and concrete batching areas should be collected into a conservancy tank and disposed of designated site

Air Quality Control

The construction contractor shall ensure the protection of air quality by undertaking the following measures at the construction site:

- Ensure that the generation of dust is minimized and implement a dust control program to maintain a safe working environment, minimize nuisance for surrounding residential areas/dwellings and protect damage to natural vegetation, crops, etc.;

- Exposed soil and material stockpiles shall be protected against wind erosion and the location of stockpiles shall take into consideration the prevailing wind directions and locations of sensitive receptors, keep stockpiles moist.
- Tightly cover trucks transporting construction materials (sand, soil, cement, gravel, etc.) to avoid or minimize spills and dust emission
- Clean up road surfaces after work
- To minimize the pollution caused by dust generation during the construction stage or on rainless day undertake watering, at least twice per day, on dusty and exposed areas at construction yards, materials stockpile, construction sites, access roads, quarry areas, borrow sites and other project areas water should be sprinkled on the construction site and on drive ways as frequently as possible
- To minimize exhaust fumes, machinery and equipment shall not be running when not in use while ensuring that they regularly serviced; and
- Powered mechanical equipment and vehicle emissions to meet national quality standards. All construction equipment and vehicles shall have valid certifications indicating compliance to vehicle emission standards.
- Construction vehicles and machinery shall be equipped with pollution-control devices to minimize emissions

Vibration and Noise Control

Vibration and noise produced by construction work will be managed as following:

- The contractor shall strive to keep noise generating activities to a minimum;
- The contractor shall restrict all operations that result in undue noise disturbance to local communities and/or dwellings (e.g., drilling etc.) to daylight hours on weekdays;
- Temporary noise barriers shall be used, as necessary, in sites where sensitive receptors are present to protect buildings and existing structures from vibration, non-vibrating roller shall be used in construction sites near buildings and structures.
- Machinery shall be turned off when not in use.

- The contractor shall inform in advance any local communities and/or residents that could be disturbed by noise generating activities such as drilling or compacting and shall try to keep such activities to a minimum;
- The contractor shall be responsible for compliance with the relevant legislation with respect to noise;
- Provision of earplugs and earmuffs to the workers working in high peak noises during the construction stage;
- Use of modern low noise machinery and vehicles is recommended;
- Activities that may involve noises and vibration should be withheld at night especially close to human dwellings.

Landscape and Topography

As construction activities are very likely to lead to negative impact on landscape and topography at project site, such impacts will be brought to a minimum by executing the following measures:

- Planting of appropriate indigenous trees, grass cover and other vegetation types on project area should be encouraged so as to enhance scenic beauty of the area; and
- Removal and proper disposal of construction debris need to be implemented after completion of construction works and shall not be stockpiled or deposited near or on water sources or other watercourse perimeter where they can be easily be washed away by high water or storm runoff or can any way enter these sources.

Occupation Health and Safety Measures

Management of M/s industrial environmental solutions Pvt Ltd is very concerned about the health and safety of the workers and provides necessary safety training and equipment to employees of existing facility and same will be done for denim plant. Furthermore, following safety measure should be observed during the construction stage of denim plant:

- Provision of health and safety induction course to all workers;
- Instilling proper code of conduct and work ethics among construction workers and ensure that they are observed;
- Provision of Personal Protective Equipment (PPE) Workers shall be provided with appropriate personal protective equipment (PPE) such as safety shoes, hard hats, safety

glasses, ear plugs, gloves, etc. at no cost to the employee. to all workers and enforce their use

- Workers shall be provided with reliable supply of potable water.
- first aid facilities that are readily accessible by workers, installing first aid kit and hire trained personnel to provide first aid;
- Fencing on all excavation, borrow pits and sides of temporary bridges
- Reporting to OSHA within 24 hours of occurrence of any accident or near miss which can cause fatal or permanent disability; and
- Workers should be educated on their own safety and safety of others;

Ground water Quality:

- All construction vehicles and equipment should be maintained in proper conditions to avoid any leakage
- Contractors shall use silt traps and erosion control measures where the construction is carried out in close proximity to the water bodies to avoid cement particles, rock, rubbles and waste water entering the surrounding water bodies.
- Construction activities should be restricted to dry season.
- All liquid raw materials and semi-liquid components must be kept at impermeable floorings and covered properly with appropriate labeling which shall avoid any leakage that might occur due to accidental spill or rain water runoff.

Impacts during Operational phase:

This section reviews the impacts of the proposed incinerator on the surroundings environment as a result of the operation of the hazardous waste incinerator. A normal operation of the incinerator normally generates the following types of emission:

Employment opportunities:

Establishment of M/s Star Waste Management Facility will help in generating new jobs for the local population. The requirement of Managers, Engineers, Workers, technicians, skilled and unskilled labor etc. will generate employment opportunities. It is estimated about 600

persons will be employed during construction phase. Hence, there is large number of employment opportunities especially for the locals of the district.

Increase in Business:

With the influx of laborers for the proposed project, there will be more opportunities for small scale business such as small food cafes etc.

A. Storage of Waste:

The project site will be available with the paved floor storage area for temporary waste storage. This facility could create impacts of major significance if not properly handled and supervised the storage area have proper covering for waste. This storage facility would help:

- To prevent scavenging of waste.
- Scattering of waste with wind.
- Nuisance from smell and odor.
- Protect the waste from sunlight and rain

Recommended Mitigation Measures

The storage facility requires following measures to be adopted for safe and healthy working conditions without affecting personnel's health and environment:

- Industrial waste should be incinerated the on the day it is received.
- Paved flooring to avoid leaching of any liquid material.
- The storage tank must be marked as storage facility.
- The workers must wear personal protective equipment like Gas mask, gloves, overall and safety shoes before entering the storage tank
- Ensuring the housekeeping of area around the storage tanks and especially inside the facility

B. Air Emissions

Stack Emissions

The combustion of any substance will generate by-product emissions that could be released to the air. Waste burning processes generate wastes, which contain particulates, Sulphur and nitrogen oxides, volatile organic compounds, dioxins/furans and acidic

gases. The Particulates also includes heavy metals present in the waste. Primary attention needs to be focused on gaseous emissions of particulates less than 10 microns in size, dioxins/furans, sulfur dioxide and nitrogen oxides due to associated Incinerator air emissions can have a major impact on the local and regional air quality if not controlled properly. The pollutants can seriously impair human health and damage vegetation and other materials.

Recommended Mitigation Measures

To limit these emissions the incinerator should be properly operated and carefully maintained. The temperature in the primary chamber should he around 600-800°C and in the secondary chamber 900- 1200°C as much as possible of the materials, which lead to these contaminants, will therefore help to minimize harmful emissions to atmosphere.

- Incinerator would have installation of Cyclone to capture large size particulate matters and Bag houses to collect fine particles to meet PEQs limits.
- After passing through cyclone and bag houses, the atmospheric emissions will enter to Scrubbers for reduction in hazardous gases like Dioxins, Hydrochloric acid, NOx, Sox etc.
- It has been found that a strong correlation exists between combustion temperature, residence time and dioxin emission. The California air resources board recommends minimum temperatures of 98.22 + 87.77°C with a minimum residence time of 1 second. The design of Incinerator should operate under the conditions as per specifications to minimize the production of dioxins.
- Production of CO and HC are directly related to the combustion efficiency therefore the optimum conditions must he ensured to prevent their production. The reasons could be incomplete burning of waste, due to fuel—rich burning (overloading of the furnace) and insufficient temperature caused by high moisture content of waste.
- Regular and thorough cleaning of the incinerator, including ash removal is absolutely essential for efficient operation. An accumulation of ash/unburnt material/incombustible matter will cause excessive temperatures to be generated and

should therefore be avoided. The incinerator should be cleaned and all ash removed regularly. Free passage of air is essential for combustion as well as for the cooling process. Therefore, the removal of deposits from within as well as underneath the combustion chamber is critical.

- Good combustion practices can control emissions by ensuring that the temperature in the combustion chamber and the time the Waste remains in the combustion chamber are kept at optimal levels. Major variations in these or other incineration operations could lead to a limited but significant belch of contaminated air emissions.

C. Ash Generation:

After incineration ash would generate and this Incinerator ash can contain concentrations of heavy metals such as lead, cadmium, mercury, arsenic, copper and zinc, which originate from plastics, colored printing inks, batteries, certain rubber products. and hazardous waste from households and small industrial generators. Recommended Mitigation Measures:

Bottom ash and fly ash are often managed together and referred to as "Combined ash". Incinerator ash is usually disposed off in a Hazardous Waste (HW) landfill or an ash-only landfill known as an Ash Monofill. Ash Monofills are specially designed to reduce the ability of heavy metals to migrate from the ash into the environment. Monofills are often co-located with HW incinerators or existing landfills to reduce transportation distances and siting difficulties. The principal environmental concern of the public regarding incinerator ash is that when ash is disposed off in a landfill, the metals and organic compounds can leach (i.e., dissolve and move from the ash through liquids in the landfill) and migrate into ground water or nearby surface water. In addition to possibly contaminating water supplies. Incinerator ash could also affect human health through direct inhalation or ingestion of airborne or settled ash.

Proposed Ash Disposal Plans

Initially the ash would be collected from reaction chambers and bag filters in from of the heap which should be should be properly wetted or covered so that there are no fugitive dust emissions, after that this ash will be handed over to the contractors of concrete making sites.

D- Noise Levels

Increased noise and vibration during operation can cause significant impacts.

Specific Mitigation Measures

Places where workers are exposed to excessive noise provide ear protection to maintain noise levels below 85dB. Ear protections include Molded and pliable earplugs, cup-type protectors and helmets. Such devices may provide noise reductions ranging from 5 to 35 dB.

Mitigation Measures for Occupational Health & Safety

• Wear safety shoes with non-skid soles

• Wear long-sleeve shirts and protect hands with protective gloves.

• Wear appropriate eye protection; consult a safety supervisor or a supplier

• Arrange for periodic inspection of incinerator structure integrity, to detect any cracking, etc.

• Wear respiratory protection (Gas Mask) during maintenance or other work in which dust and noxious gases may be released into the atmosphere

Potential Impact on Social and Cultural Environment

Following parameters will be adapted for the assessment of the well-being of the poor people near the project site that will use to assess the social, economic, and cultural impacts of the project.

A- Inconvenience due to raw material and product transporting Vehicles:

During the operational period a minor impact can be the movement of vehicles from the main road to the subject project boundary; it can affect the traffic on other roads and can cause minor annoyances to the residents and other industrialists of the area. The transportation of heavy materials and equipment likely to damage the roads use for the transportation of heavy machinery.

Mitigation measures: Efforts will make to discuss traffic conditions so that regular traffic might not disturb. Transporters engage for the project will be forced to adhere to the load specifications of the access road. No overloading will be allowed in any case.

Nature of impact: Direct
Duration: Short term
Timing: construction phase
Reversibility: reversible
Likelihood: low
Consequences: low, as it links the main Sheikhupura Road and vehicles rarely used the sub roads
Impact significance: slightly significant

B- Cultural Issues:

Induction of outside workers in the Contractor's labor can cause cultural issues with the local community as the local community is very sensitive about their cultural values. Also theft problems to the local community may arise by the labor force and vice versa.

Mitigation Measures:

Good relations with the local communities will be promoted by encouraging contractor to provide opportunities for skilled and unskilled employment to the locals, as well as on-the-job training in construction for young people. Project manager will restrict his staff to mix with the locals to avoid any social problem.

Nature of impact: Direct
Duration: Short term
Timing: construction phase
Reversibility: reversible
Likelihood: low
Consequences: low, project Proponent implemented mitigation measure,
Impact significance: slightly significant

C- Accident risks:

Unmonitored construction activities can create an accident risk for the local residents particularly children and labor force.

Mitigation measures:

Contractor must have first aid kits along with the medical officer in the field in case of minor injury, but for unfortunate accident services of nearby hospitals availed. Routine medical check-ups of the entire field staff including unskilled labor conducted by a qualified doctor are recommended.

Training of the workers must be arranged regarding safety procedures, environmental awareness, equipping all construction workers with PPEs, safety boots, safety helmets, ear plugs, gloves and protective masks. Monitoring must be carried out to check for the sustainable use of PPEs.

Nature of impact: Direct
Duration: Short term
Timing: construction phase
Reversibility: not applicable
Likelihood: moderate
Consequences: moderate, if complete trainings and mitigation measure will implement.
Impact significance: significant

D- Privacy Issues:

Disturbance can be happened at the time of construction, to the privacy of women residing in the work area when workers worked at height.

Mitigation Measures:

Contractor will take care of the privacy of residents, especially women near the working area.

Nature of impact: Direct
Duration: Short term
Timing: construction phase
Reversibility: reversible
Likelihood: low
Consequences: low, as contractor took care of the matter
Impact significance: slightly significant

E- Sharing of resources:

During the construction and operational phase of the project, workers will share the common resources like potable water, fuel, wood. It can create conflicts between work force and local population.

Mitigation measures:

The contractor will maintain a close friendly relationship with the local communities to ensure that there may not be any conflict related to common resources utilization. He must get permission of the local population before using their common sources of water and other resources.

Nature of impact: Direct
Duration: Short term
Timing: construction phase
Reversibility: reversible
Likelihood: low
Consequences: low, if conditions will be followed and mitigation measures employed
Impact significance: significant
After assessing the project activities and investigating the project area, the environmental consultants, PGEE, have concluded that, if the activities are undertaken in this report, and the recommended mitigation and environmental management measures are adopted, the project will not result in any long-term or significant impacts on the local community or the environment.

Potential Environmental Enhancement Measures:
The proposed project will be installed with all precautionary measures to enhance and safe the environment. Following necessary measures will be adopted during construction and operation:

- Sprinkling of water will be done on dusty roads and tracks.
- PPEs will be provided during construction activity.
- Constructional waste and domestic solid waste will be disposed-off, recycle or utilized properly.
- Local people will be informed in advance when work is about to start in an area.
- Machinery will never be left unattended.
- Efforts should also be made to discuss traffic conditions so that regular traffic is not disturbed. Transporters engaged for the project would be forced to adhere to the load specifications of the access road. No overloading would be allowed in any case.
- Safety signs and boards will be placed during construction.

- Machinery will be kept maintained.
- Mark the boundary around the working area.
- Waste water will be treated through waste treatment system that will be installed within the premises of the subject project.
- Proper SOPs will be followed with proper schedule along with the HSE conditions.
- Area will be restored with native plants. A proper tree plantation plan will be formulated to save the environment.
- Solid waste will be handed over to contractors and agreement will be made.
- Noise will be controlled by adopting proper measures.
- PPEs will be provided to workers during working.
- Firefighting equipment's and system will be installed.
- Safety signs will be placed at all locations where required.
- Hygienic conditions will be ensured and proper quality will be maintained by quality control testing.
- First aid facilities will be made available.

Purpose of Mitigation measures

Purpose of mitigation measures should include:

- **What is the problem i.e. in terms of "major environmental impacts" which may arise by the subject project activity?**

The major impacts may arise by the subject project are, dust, noise, solid waste, and waste water. Other impacts are of minor importance. These impacts will arise during construction and operation but precautionary measures will be adopted prior to start the activity, during the activity and post activity.

- **When the problem will occur and when it should be addressed?**

Any impact that would arise due to the subject project activity will be addressed through proper channel and on site. Trainings will be conducted regarding HSE, firefighting, best work practices

etc. while other precautionary measures are also adopted to make the project safe and environmental friendly.

- **Where and how the problem should be addressed?**

Project Proponent will be responsible for the implementation of EMP and if required he will appoint a HSE manager/environmental manager along with site manager to assess any impact that could be arisen during construction and operation of the project. He is responsible to address the problem and to mitigate it.

Ways of achieving mitigation measures

By adopting proper mitigation measures, any anticipated major or minor environmental impacts could be controlled or mitigated. The detail of impacts and mitigation measures have been discussed previous chapters.

- **Changing in planning and design:**

Project Proponent of M/s Green Plant Waste Management Facility will take appropriate measures to provide pollution free and safe environment during the project activity by implementing improved management practices and monitoring techniques suggested in EMP. Management will further take necessary actions to mitigate any residual impacts.

- **Improved monitoring and management practices:**

Project Proponent of M/s Green Plant Waste Management Facility will adopt such plan that will assure the minimum impact on the environment and health by implementing proper mitigation measures. Design of the building will assure the structure stability in a long run.

- **Compensation in money terms:**

Project site is the property of M/s Star Waste Management Facility and there are not any land ownership disputes. If in future any issue would arise regarding environmental degradation, the project Proponent will compensate in money terms as he has assured to achieve PEQS/ PEQS and compliance to other regulations made under PEPA 1997 (Amended).

- **Replacement, relocation and rehabilitation:**

Plantation will be done within the unit and for this area will be reserved. Project Proponent will further develop Restoration/ reclamation or tree plantation plan to restore the project area. Plantation will be enhanced with native species within the unit, along the boundary wall and along the road side as per direction by EPA Punjab.

Chapter # 6

ENVIRONMENTAL MANAGEMENT & MONITORING PROGRAM

ENVIRONMENTAL MANAGEMENT PLAN

An Environmental Management Plan (EMP) is a framework for the implementation and execution of mitigation measures and alternatives. It usually covers all phases of the project, right from pre-construction to the operation and maintenance phases of the transmission line project. The plan outlines mitigation measures that will be undertaken to ensure compliance with environmental laws and regulations and to eliminate adverse impacts. The objectives of an EMP, thus, are:

- To ensure that mitigation measures are implemented;
- To establish systems and procedures for this purpose;
- To monitor the effectiveness of mitigation measures;
- To ensure compliance with environmental laws and regulations

Purpose and Objectives of the EMP:

The primary objectives of the EMP are to:

- Facilitate the implementation of the mitigation measures identified in the EIA.
- Define the responsibilities of the project Proponent.
- Define a monitoring mechanism and identify monitoring parameters in order to:
- Ensure the complete implementation of all mitigation measures.
- Ensure the effectiveness of the mitigation measures.
- Provide a mechanism for taking timely action in the face of unanticipated environmental situations
- Identify training requirements at various levels.

Environmental Monitoring Plan

- The monitoring is carried out in accordance with PEQS.

- Monitoring program is undertaken for compliance of mitigation measures.
- Monitoring for various parameters is done before the construction phase as per direction from EPA.

Performance Indicators

The performance indicators / parameters having significant impact on physical, biological and socio-economic environments will be evaluated. These are given below:

- **Ambient Air Quality**
  Dioxins and Furans, HCl, Hg and its components, PM_{10}, CO, NO_x, and SO_2
- **Water Quality**
  TDS, TSS, COD, oil and grease, chloride, lead, zinc and cadmium
- **Noise Levels**

Environmental Monitoring Cell (EMC)

EMC of the project will undertake monitoring of the Safety, Health and Environmental Aspects. It will ensure implementation of EMP and apprise the General management of the unit on fortnightly basis.

Training of Monitoring Staff

Training of the monitoring staff will be arranged at site and off-site Special cadres will be run about functioning of the project and apparatus including the firefighting and first medical aid.

Monitoring of Quality

The EMC will arrange monitoring of the quality of air, water, noise and waste water on quarterly or monthly basis from any EPA Certified/approved laboratory if required.

Monitoring Stages

Monitoring Stages

Monitoring of environmental parameters need to be carried out during the following stages in addition to post-project period:

- Construction Stage
- Operation Stage

Monitoring Plan

Following aspects need to be monitored regarding the subject project during pre-construction, during construction and post construction.

- Air quality
- Water quality
- Noise level
- Management of utility services including water supply, sewerage disposal, electric supply and solid wastes.

Management Approach:

The overall responsibility for compliance with the environmental management plan rests with the project Proponent.

A certain degree of redundancy is inevitable across all management levels, but this is in order to ensure that compliance with the environmental management plan is crosschecked.

Institutional Capacity, Environmental Technical Assistance and Training Plan

Following functionaries will be involved in the implementation of EMP:

- Project Proponent
- HSE/Project Manager
- In-Charge Administration
- Supervisor of project
- Environmental Engineer

In order to raise the level of professional and managerial staff, there is a need to upgrade their knowledge in the related areas. HSE/Project Manager should play a key role in this respect and arrange the training programs.

HSE/Project Manager will provide training to staff and workers about the best environmental management practices at the construction site and affective implementation of the EMP.

The training modules will include air, noise and water pollution monitoring, social awareness, Environmental Laws, National Environmental Quality Standards (PEQS), Usage of personal protection equipment's, and health and safety related issues on the construction site.

The HSE/Project Manager will train all workers & staff in basic sanitation and health care issues (e.g., how to avoid malaria and transmission of Sexually Transmitted Infections (STI) HIV/AIDS and in general health and safety matters, and on the specific hazards of their work. Training should also consist of basic hazard awareness, site specific hazards, safe work practices, and emergency procedures for fire, evacuation.

HSE/Project Manager will arrange Training on monthly or quarterly basis regarding health & safety, hygiene, firefighting and first aid.

Training of Workers and contractor

Training of building contractor & workers will be the part of the TORs regarding the construction of the scheme. The provisions given in EIA Report *Chapter 4 Screening of Potential Environmental Impacts & Their Mitigation Measures* will be followed.

TORs will be including the training and submission of reports in the following area:

1. Handling of Machineries in a safe way
2. Handling of hazardous waste in a safe way
3. Proper handling of Ash disposal
4. Use of PPEs
5. Maintenance of vehicles and submission of Environmental Monitoring Reports
6. Maintenance of Water Consumption records
7. Testing of water and waste water and submission of Environmental Monitoring Reports
8. Placement of safety signs/boards during construction
9. Sprinkling of water on the roads and dusty tracks
10. Monitoring of generator emissions

Training regarding all other aspects of HSE will be ensured by the contractor during the construction phase.

Responsibility of EMP

Overall responsibility for implementation of EMP will be that of project proponent. He will appoint a HSE/Project Manager of relevant qualification. HSE/Project Manager will act as Environmental Manager and will manage the all HSE condition at the PEQS.

Summary of Impacts and their mitigation measures:

Table 1: Summary of impacts and mitigation measures

Impacts	Mitigation Measures
Project Location	
• Acquisition of land • Loss of environmentally sensitive areas • Changes in traffic pattern • Potential conflicts with stakeholders • Resettlement issues	✓ It is recommended for obtaining of approval from other relevant departments. ✓ The proposed land is the property of the M/s Star Waste Management Facility. ✓ There is not any sensitive area near the project site. ✓ Many other industries are also working near the project site. ✓ The project Proponent will achieve the PEQS/ PEQS at the boundary walls of the subject project to avoid the environmental impacts on the nearby industrial unit. ✓ There is no need to change the traffic pattern due the development of the subject project because no. of

	industries has been developed at the same road. ✓ It is recommended to settle the issues through scoping and specific group discussions. ✓ No resettlement issues
Project Design	
• Structure stability • Soil structure and soil bearing capacity • Road infrastructure design • Emergency exits • Firefighting system • Wastewater disposal system design • Electricity hazards • Ventilation	✓ Structure stability of the project building should be ensured ✓ Geotechnical investigation of the project site should be conducted. ✓ Safe road infrastructure design should be provided at the project site. ✓ Emergency exist points should be marked within the project building. ✓ Firefighting equipment must be maintained at the site in good working condition. ✓ Efficient wastewater disposal system should be designed for proper treatment of wastewater ✓ Electricity system should be designed safe and sound. ✓ Proper ventilation should be ensured in the project building.
Construction and operation phase	
Land & Soil	

• Land or Soil Erosion during the construction phase • Habitat destruction • Scarring of the landscape and aesthetic beauty. • Clearing of native plants will disturb the complexity of the ecosystem of the proposed area. • Leakage of oil from storage area may contaminate soil	✓ Sprinkling of water is recommended ✓ After construction phase, the project Proponent will restore the land by plantation. ✓ All spoils will be disposed of as desired and the site will be restored back to its original conditions ✓ Aesthetic of the area will be maintained. ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall and away from any potential source of fire
Air pollution and Dust emission	
• The transportation of the project machineries and material also may cause dust. • Un-metaled roads may cause dust. • Dust raised on dirt tracks by project-related vehicles. • Dust from drilling of deep holes. • Combustion products from vehicles used for project-related activities	✓ Air emissions controlled devices (Cyclone, Bag filters, Scrubbers) must be installed to control the air pollution ✓ Water the construction site periodically to minimize fugitive dust generation while laying foundation ✓ Store all construction materials in a manner to minimize generation of dust and spillage on roads. ✓ During excavation works drop heights will be minimized to control the fall of materials reducing dust escape. ✓ Sprinkling of water must be done to control the dust or PM ✓ Vehicle emissions inspection should be done on regular basis ✓ Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter.

	✓ Vehicles/ trucks should be serviced regularly ✓ All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke.
Noise	
• The major sources of the noise at proposed project site are project related machinery. • High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mentally disturbance. • Noise level will not exceed 75 dB(A) at the distance of 2 km radius, activity site is located at a safe distance from the nearest human settlement . • Noise from construction activities from site preparation, earth works, foundation and plant equipment installation	✓ Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. ✓ Proper maintenance and tuning of the vehicles should be done. ✓ Sound proof room should be built for generator (if any) to control the noise. ✓ A speed restriction of 40 km/h will be imposed on all construction vehicles.
Waste Water	
• Domestic waste water from the camp • Minor generation of waste water from construction activity. • Water Contamination due to improper storage of construction material, • Water contamination due to improper debris disposal, • Spread of diseases, underground water contamination	✓ Domestic waste water will be drained out in nearby local drain after treated in septic tanks ✓ Oils, lubricants, chemicals, and other listed hazardous materials should be stored safely at their designated spots, enclosures or store rooms, which should be safe from rainfall

Solid waste/Ash	
• Solid waste may generate from construction activity, domestic and packing material of project related machineries. • Solid waste may generate from operation of project.	✓ A solid waste management division should be formulated to deal with the proper disposal of solid waste, supervised by HSE Manager, SW Manager, and other related personnel. ✓ Solid waste generated from the construction activity as sand, stones residues etc. that should be utilized in restoration of the quarry area whereas solid waste from the domestic sources should be disposed off properly ✓ Proper solid waste management system is recommended for ✓ Solid waste related to the operation will also manage in scientific way. ✓ Ash generated from Incinerator will be handed over to the contractors for concrete maki g procedure.
Health and Safety	
• Health and safety issues will be arisen during construction activity, handling of material, machinery and improper practices of work • Health safety issue may arise during regular operations	✓ Use of PPEs should be implemented at workplace. ✓ First aid measures/medical facility should be provided to project related employees. ✓ Safe drinking water must be provided to workers, staff, and poor people of the area. ✓ Water consumption records should be maintained ✓ Safety signs & boards should be placed at during construction activity. ✓ Construction site should be fenced properly to avoid any damage to nearby settlements

	✓ smoking or any drugs should be prohibited during working hours or performing work ✓ At the time of earthwork, fencing will be ensured for the area under the exploration

Equipment maintenance details:

The subject project is installation of Incinerator under the name of M/s Star Waste Management Facility . The Facility will maintain the records for Health Safety & Environment and will hire HSE manager to check and deal with the HSE issues of whole estate.Individual industries will also hire HSE manager to maintain HSE condition within theirrespective industry. The Facility shall maintain PPEs, medical facilities, firefighting Equipment's as fire buckets, fire hydrants and fire extinguishers and records for their periodic fillings or replacement.

Environmental Budget

The cost which is required to effectively implement the mitigation measures is important for the sustainability of the Project in operation stage of the Project.

Facility has allocated the Environmental Budget of 2% of total cost for the Training, maintenance and management of Environment that will include filling and maintenance of equipment's, restoration, plantation, and availability of PPEs, strategic planning to cope with any emergency situation and formulate the disaster management plan to cope with natural disaster. Any equipment or devices failure or replacement will be included in this budget.

HSE training	**On regular basis**
Maintenance and management of environment	On regular basis
Maintenance of equipment	On regular basis
Availability of PPEs	During production hours

Strategic planning to cope with any emergency	As per policy
Formulate the disaster management plan to cope with natural disaster	As per policy

ENVIRONMENTAL MANAGEMENT PLAN
STAR WASTE MANAGEMENT FACILITY

Serial. No	Aspects	Impact & Mitigations to be taken			
		Impacts	**Mitigation measures Construction/Operation**	**Responsibility**	**Monitoring**
Land acquisition for the proposed project					
1	Land acquired for the lease for the proposed subject project	Nil	• The site for proposed project is property of Proponent	Proponent	Environmental Consultant/ EPA Punjab
Land use & soil erosion					
2	Land Use &Soil	Particulate Matters (PM) pollution, Clearing of the vegetation Scarring of the landscape and aesthetic beauty.	• Measures will be taken to avo MZ id soilerosion and dust pollution. • Restoration and reclamation plan will be developed to restore the natural landscape of the area. • Plant nursery, garden will be developed to rehabilitate the native plants of the area.	HSE Department	Environmental Consultant/ EPA Punjab

		Clearing of native plants will disturb the complexity of the ecosystem of the proposed area. Dust emissions will generate during the construction Flue gases will be generated due to the involvement of generators and other machinery.	• Project Proponent will make any possible efforts to limit the impact on flora and fauna. • The management of Proponent has serious concern to preserve the environment and natural elevation beauty of the site		
Ambient Air Quality					
3	Air Quality	**Particulate Matter, NOx, Sox, Dioxins and Furans and other gasses will release from stacks.**	• Air emissions-controlled devices (Cyclone, Bag houses, Scrubbers) must be installed to control the air pollution • Water the construction site periodically to minimize fugitive dust generation while laying foundation • Store all earthwork and construction materials in a manner to minimize generation of dust and spillage on roads.	HSE Department	Environmental Consultant/EPA Punjab

		• Dust emission due to vehicles on un-metaled roads. • Dust due to Construction • Dust raised on dirt tracks by project-related vehicles. • Dust emission during earthwork • Gases emissions from the vehicles Air pollution due to site visiting vehicles/ transported trucks, hauled trucks, machinery & generator (if any)	• During excavation works drop heights will be minimized to control the fall of materials reducing dust escape: Temporary cover may be provided for earthwork if necessary • Sprinkling of water must be done to control the dust or PM • Vehicle emissions inspection should be done on regular basis • Sprinkling should be done on the unpaved area to avoid dust pollution/ particulate matter. • Vehicles/ trucks should be serviced regularly • All project vehicles will be checked regularly to ensure that engines are in sound working condition and are not emitting smoke. • Quarterly or monthly monitoring is recommended by EPA certified labs to check the compliance with PEQS as per EPA PEQS Rules 2001 Air quality was conducted by EPA certified lab and results are incorporated within this report		

Noise & Vibration					
4	Noise	The major sources of the noise at site are project related machinery. High noise level cause hearing loss, deafness, high blood pressure, headache, depression and mentally disturbance. Noise level will not exceed 75 dB (A) at the distance of 2 km radius, activity site is located at a safe distance from the nearest human settlement . Noise from construction activities from site preparation, earth works, foundation and plant equipment installation.	• Personal Protective Equipment PPEs including Ear muffs, Ear plugs and other noise abating equipment will be provided to the workers and other staff of the subject project. • Proper maintenance and tuning of the vehicles should be done. • Sound proof room should be built for generator (if any) to control the noise. • A speed restriction of 40 km/h will be imposed on all construction vehicles. • Quarterly or monthly monitoring is recommended by EPA certified labs to check the compliance with PEQS as per EPA PEQS Rules 2001. • Noise level monitoring was conducted at different location and results are incorporated within the *report.*	HSE department	Environmental Consultant/ EPA Punjab

Soil Contamination					
5	Soil contamination	Contamination of soil due to oil and other chemicals storage, transportation Soil contamination due to waste water generated from the project activities	• Industrial waste will be stored in a storage area having impermeable floor, which would not allow to leaching of anything. • Ash generated from incinerator will be disposed of in a proper landfill in within project premises/ site. • SOPs will be developed for the storage of oil and other chemicals handling and transportations • Soil contamination must be controlled by adopting mitigation measures such as storage of oil, fuels etc. under paved area, by maintaining leakage record of construction vehicles, and by regular inspection (admitted by Chief Executive Officer). • Septic tanks will be used for treatment of water. Treated water will be drained into nearby Industrial drain. • Tarpaulin sheets should be placed under generators and other leaching substances • Treated water will be used for plantation	HSE Department	Environmental Consultant/ EPA Punjab

			Proper storage of oil, fuel etc. is recommended under paved area		
Health and safety					
6	Health and safety	Health & safety issues of workers and nearby community	• Trainings of the workers is recommended for health & safety, first aid and firefighting. • Proponentmust provide First aid facilities to workers in case of any injury or accident. • Safe drinking water must be provided to workers, staff, and poor people of the area. • Water consumption records should be maintained • Provision of Proper PPEs must be ensured at workplace • Assembly point and exit points must be available at workplace • Electric wires, D.Bs must be kept covered & closed to avoid any electric Hazards	HSE Department	Environmental Consultant/ EPA

			• smoking or any drugs should be prohibited during working hours or performing work • Safety signs & boards will be placed at the time of construction activity • Security guards will be appointed at the construction site • At the time of construction and earthwork, fencing will be ensured for the area under the exploration Further proper housekeeping and safety arrangements must be ensured at the subject project		
Waste Water					
7	Waste water	Minor generation of waste water from construction activity. Water Contamination due to improper storage of construction material, Water contamination due to improper debris disposal,	• Waste water generated from the constructional activity will be used as sprinkling on the dusty tracks or for restoration of the land. • Waste water monitoring is recommended on monthly or quarterly basis by EPA certified lab to check the compliance with PEQS and as per EPA PEQS Rules 2001 • Domestic waste water will be treated in septic tanks and treated water will drain into nearby industrial drain.	HSE department	Environmental Consultant

		Waste water pollution, Spread of diseases, underground water contamination			
Solid waste generation					
8	Solid Waste/Ash Generation	Land & soil contamination, aesthetic degradation, foul smell etc. Solid waste generation from the construction activity, domestic and project process sources	• A solid waste management division will be formulated to deal with the proper disposal of generated Ash supervised by HSE Manager, SW Manager, and other related personnel. • Ash will be handed over to the contractor for concrete making process. • Constructional waste must be utilized for road filling or maintenance purposes • Sludge from the septic tank must be replaced on regular basis • It is recommended to ensure Proper housekeeping. • It is recommended to adopt proper waste management system	HSE Department	Environmental Consultant/ EPA Punjab
Odor					

9	Odor	There will generate odor while moving and storage of collected industrial waste.	While transferring the industrial waste, it will be properly covered to minimize its odor. Collected industrial waste will not be stored for long time in storage area. Incineration of per day collected waste will be ensured to minimize the its scavenging and odor.	HSE Manger	
Energy requirement					
10	Energy requirement	Resource depletion	• Do not waste the energy/electricity when there is no need of it. • Use energy efficient machinery and equipment • Use energy saving products • Conduct and maintain records for energy audits • Do not leave the machinery in running form when there is no working being done • Machinery must never be left unattended • It is recommended to save and conserve the energy and adopt energy	HSE Department	Environmental Consultant/ EPA Punjab

			efficient technologies during the construction phase		
			Socio economic impacts		
11a	Resettlement	Resettlement issues	• The proposed area under the investigation is devoid-off any human Settlement	NA	NA
11b	Language	Change in cultural language	• Maximum employment of Local people is recommended to preserve the local cultural language. • It will help in communication with the local people to resolve any emerging issue near the project area	Proponent	NA
11d	Health	Social performance of the individuals in the area	• The project Proponent will assist the local impacted community for the improvement of health services	Proponent	Proponent
11e	Culture and norms of the area	Change in culture by the influx of nomadic people	• Maximum local employment should be ensured to preserve the culture of the area	Proponent	NGO survey/Environmental Consultant

Need for Disaster Management and Emergency Response System

In order to cope up with the possible hazards it is imperative to prepare the Disaster Management Plan and rehearse it frequently. To evaluate effectiveness of the system preparedness exercises and drills will be undertaken frequently. Small courses will be run to train the relevant persons about their actions during emergency. The administration staff need be familiar with the firefighting procedures and equipment.

Communication System for Declaring Disaster and Emergency Situation

On immediately on occurrence of emergency situation all employees will be informed through disaster Alarm System. The emergency siren means that all employees will assemble at the previously designated assembly areas. At this place the Head of HSE department will instruct the workers regarding their respective duties.

Identification of Risks/Possible Threats

The project and other occupants may come across untoward incidents on account of human interventions and natural catastrophes. Human induced risks may include the placing of an explosive device for causing damage to building and burning of essential office/documentary records. Improper use of electrical, heating and cooking gadgets may lead to outbreak of fires. Similarly, the smokers may create large-scale burnings. The natural hazards consist of the possible damage to of the building due to an earthquake or windstorm. Thus, there is need of carrying out risk assessment for such eventualities.

According to public Consultation natural disaster are very rare in the area. After the operation of the project proper SOPs will be developed to cope with emergency situation.

Risk Management

Definition of Risk

Risk may be minor, serious or fatal. It may be rare, often or frequent.

Risk = Damage X Rate of Occurrence.

Risks are broadly acceptable, tolerable, unacceptable and residual.

Elements of Occupational Health and Safety Management System (OHMS)

For an effective OHMS, the management of the project will implement the following elements:

- Formulation of OHS Policy
- Identification of risks, hazards and countermeasures
- Adoption of OHS targets based on OHS policy
- Formulation of OHS plans.
- Incorporation of opinions of stakeholders in OHS measures
- Implementation and operation of OHS plans
- Establishing an organization
- Documentation
- Emergency situation
- Routine inspections and improvements
- System audits
- Revision of OSHMS
- OHS education

Post Disaster Rehabilitation

On close of the disaster the management will immediately undertake activities for restoring the normalcy at the site. Efforts will be made to carry on with the operations.

Chapter # 7

PUBLIC CONSULTATION & STAKEHOLDER PARTICIPATION

This section deals with the social acceptability of the project and the area. Consultation with the stakeholders is a tool for managing two-way communication between the project Proponent and the affected public. Its goal is to improve decision making and build understanding by actively involving individuals, groups and organizations, which have stake in the project. This involvement increases project's long term viability and enhances its benefits to locally affected people and other stakeholders. It gives the feeling of an ownership to the local population and public indolent is also helpful in smooth implementation and success of the project.

In order to evaluate the socioeconomic and environmental impacts, filed surveys are extremely essential. In addition to the surveys at the preliminary stage, consultation with the community and their active participation plays a vital role in successful implementation of the project. To identity the different types of stakeholders and ascertain their perceptions about the proposed project (Environmental Impact Assessment (EIA)) social survey was conducted. Informal group discussions were also held as an additional tool for obtaining feedback from the stakeholders that are being discussed in the following pages.

Objectives of Consultation

Public consultation plays a vital role in studying the effects of the project on the stakeholders and in the successful implementation and execution of the subject project. Public involvement is a compulsory feature of environmental assessment, which leads to better and more acceptable decision making. The objective of the consultation with stakeholders is to help verify the environmental and social issues that have been presumed to arise and to identify those which are not known or are unique to the construction of the proposed unit.

The important general objectives of the consultation process are:

- Information dissemination, education and liaison;
- Informing the stakeholders about the subject project

- Providing an opportunity to local public to raise their views and helping in more sensitive considerations for the formation of mitigation measures for the subject project
- Providing those involved in the planning stage with an opportunity to ensure that the benefits of the proposal are maximized and that no major impacts have been overlooked
- It provides an opportunity to local public to influence the design of project in a positive manner
- Increasing public confidence in front of Proponent, reviewers and decision makers
- Identification of problems and needs of the stakeholders and public
- Providing better transparency and accountability in decision making stage;
- Reducing conflicts through early identification of contentious issues and working on them to find acceptable solutions
- Reaction, comment and feedback of stakeholders on project;
- Developing proposal which are truly sustainable;

Methodology of consultation:

The EIA team carried out public consultations at various locations around the Project Site. The stakeholder's consultation during this phase of the work targeted the project area, administrative and private offices, Govt. offices, shops, etc. near the Project area:

- Selection of the stakeholders for consultation, reconnaissance of the project site and initial discussions with the neighboring factory workers, residents, shopkeepers, drivers etc.
- Environmental consultants and social specialists and documenting the opinions of the stakeholders expressed during the meetings etc.

Stakeholder identification:

Stakeholders considered at all levels according to the importance of the project. They are at provincial, district and village level. The process of consultation is an ongoing process which continues during the project life cycle and even after the submission of this environmental assessment report and so on. Therefore, three-tier approach was adopted. Stakeholders were identified, categorized and consulted at provincial (EPD Punjab, Irrigation department, Agriculture department, Wildlife department etc.), district level (EPD, Irrigation department, Agriculture department, Wildlife department etc.) & village level (Direct & indirect affects and Locals)

Consultations with government, provincial and district level departments were carried out through meetings and visits while consultations with locals, villagers, neighbors and directly affected peoples were under taken during baseline study of the area.

Consultations were held with the followings;

District Level:

1. Environmental protection department, Faisalabad
2. Agriculture department, Faisalabad
3. Forest Department, Faisalabad
4. Wildlife department, Faisalabad
5. Irrigation Department, Faisalabad

Village Level:

1. Neighboring workers
2. Shopkeepers
3. Traders
4. Drivers

Consultations:

A series of public consultations were required to get the feedback/ concerns of the different departments, Industries, local public, PAPs, and general public residing near the subject area.

Chief Executive Officer

Possible impacts and mitigation measures related to the proposed project were discussed with the project Proponent and management. They assured to take all suggested mitigation measures to control any discrepancy arose by the project and to make the project environmental friendly.

Responsible Authority

Management of M/s Star Waste Management Facility is the responsible authority to take all measures throughout the life cycle of the project.

Other departments and agencies

For the impact analysis detailed meetings were held with the management of M/s Star Waste Management Facility local community, education institutes, health institutes, hospital and NGOs. Issues were discussed that may affect the environment and also the implementation of proposed project. All possible mitigation measures were considered and incorporated in the Environmental Management Plan.

Scoping sessions, focused group discussion and way side consultations were held with the relevant stakeholders in the area. The purpose of such consultations is to obtain the feedback from the relevant persons.

Environmental Practitioners and Experts

Team visited the project site, had discussions with stakeholders and consulted with the local people of nearby and other villages to evaluate the project socio-economic impacts. People of the area belong to different professions like mostly belong to employment, own businesses, doctors, some in abroad, in Army, teaching, in agriculture, etc. Women were also consulted for their point of view regarding the betterment of the area by this project, some of them communicated but according to social value of the area they mostly hesitate to communicate comfortably and get pictured. People provide the massive information about the project and have positive remarks regarding the project development.

Affected & Wider Community

There is no affected community present in the radius of our study area. PGEE team has consulted with the inhabitants of the Faisalabad area. They provided positive remarks regarding the proposed project. Stakeholders participation Performa's and socioeconomic questionnaire were get filled by the inhabitants to evaluate the project socio-economic impacts.

Data collection tool used was questionnaire; it was 18 items based semi structured questionnaire . The questionnaire was designed to address education, employment and population issues. Their responses were duly recorded. Some of the questions were asked not only to get the information but also to get the impression of an interviewee**.**

RESULTS OF SOCIO-ECONOMIC DATA COLLECTION

The questions were designed in order to know that what inhabitants think about the proposed project and it was amazing to note that majority of the population think in the positive manner about the installation and expansion of new industries in their area. The people foresee strong impacts regarding employment, business and structural development due to this project. The management of M/s Star Waste Management Facility ensures its commitment towards maintaining the aesthetics and environmental quality of the area, land reclamation and providing job opportunities subject to relevant

skills assessment of the local community during construction and operation of the project.

Main Theme	Concerns	Solutions
Employment	To engage local people during construction and operation phases on priority basis	M/S Star Waste Management Facility will engage local people on priority basis. It will develop job opportunities for the local based on skill assessment individuals

Environmental Impact	Air pollution and noise impacts need to be properly mitigated	M/S Star Waste Management Facility . will ensure water sprinkling for mitigation of issues related to dust/PM. Tree plantation act as natural noise barrier. Process and instrument efficiency ensure mitigating problems related to noiseand air

*Questionnaire filled during the public consultation/interview are attached. (**Annexure**-F)*

Awareness about project

Awareness Regarding the Proposed Project	Acceptability of the Proposed Project
Although people did not know the exact project; 80 % respondents were aware about the increased industrial activity in the area in upcoming years.	**100% favored the Project with demand of job opportunities for thelocal**

Sample size

50 sample size was selected by the Team of consultants for conducting the socioeconomic survey. Women were also consulted for the said survey; some of their names are mentioned in the above list of respondents while most of them were not willing to give personal information.

Statistical Analysis

SPSS 19.0 has been used for the statistical analysis of the data collected during the visit of study site villages through questionnaires

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Result and discussion

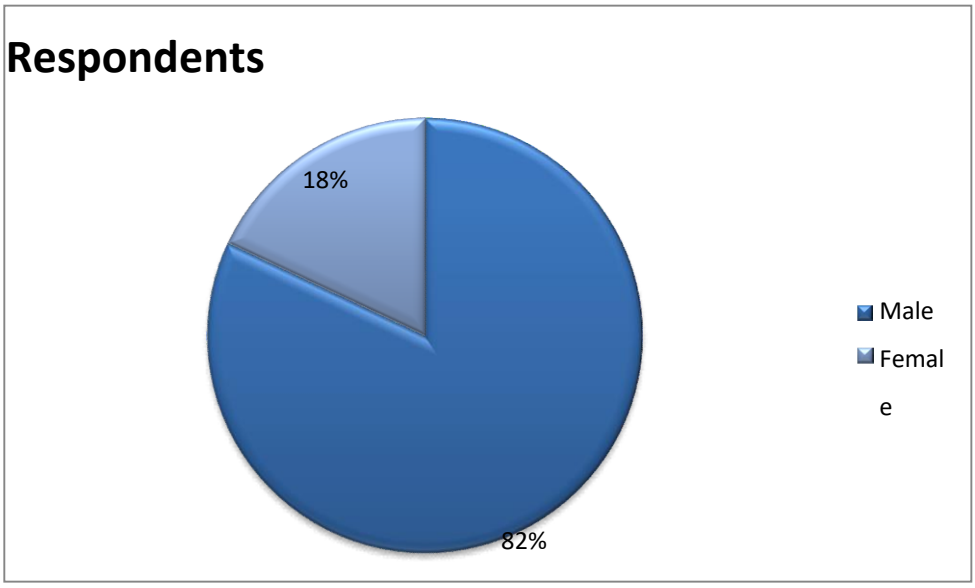

Figure 1: Gender ratio of respondent

Discussion

According to graphical representation, 82 respondents were male while 18 % respondents were female. The number of female respondents is less as compared to male respondents because according to the social binding female hesitates to respond or communicate comfortably.

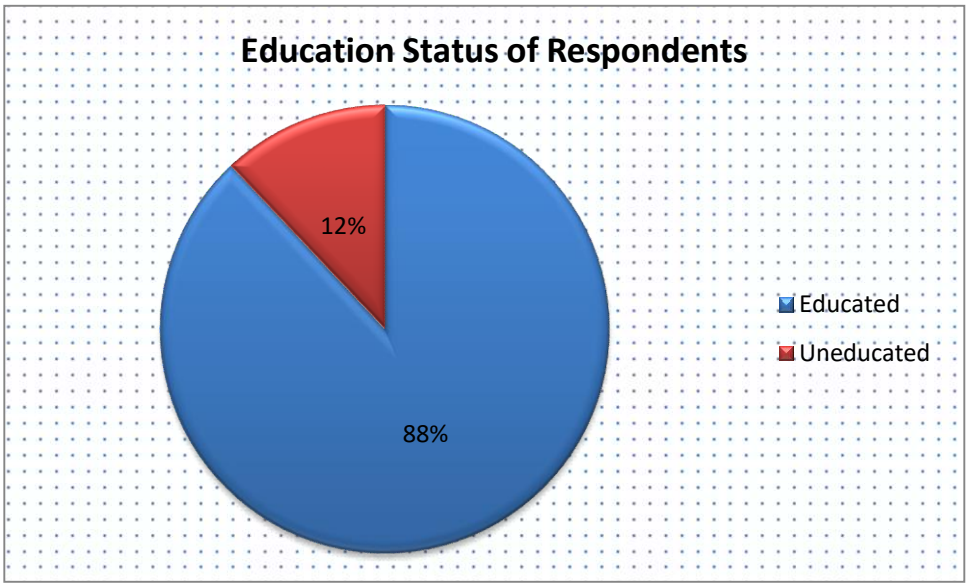

Figure 2: Education status of respondents

Discussion:

According to above graphical representation, 88 % respondents were educated while 12% were uneducated. So, according to the survey overall education status of the area is good.

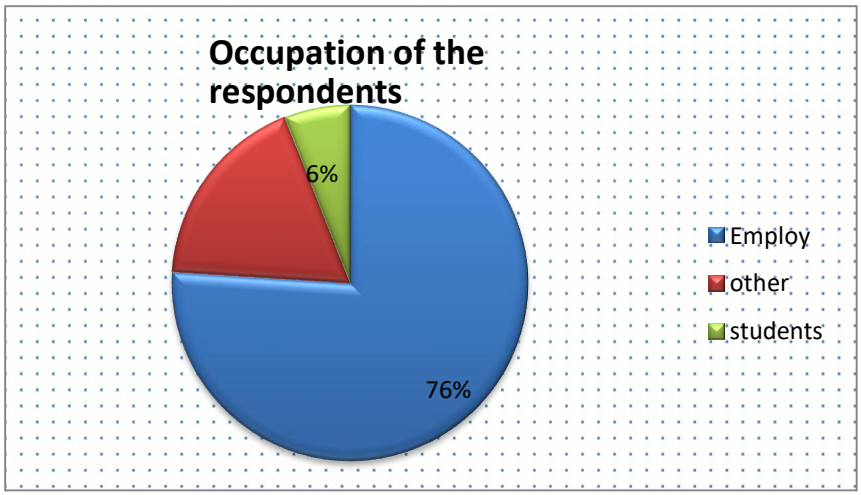

Figure 3: Occupation of respondents

Discussion

According to above graphical representation, source of income of majority of the respondents in the area was mainly employee in the private and government sectors. According to the survey 6% were students while all other respondents' source of income was business man, farmers, doctors and teachers.

Discussion:

As per survey, 79% people were satisfied with the proposed project of M/s Star Waste Management Facility and they gave positive remarks regarding the existing unit and proposed project as they got job over there, their living standard raise over working there. While 12% respondents were have no opinion regarding the project and 9% respondents were not satisfied with the production unit due to their concern regarding the aesthetic degradation and no preference to local people for jobs.

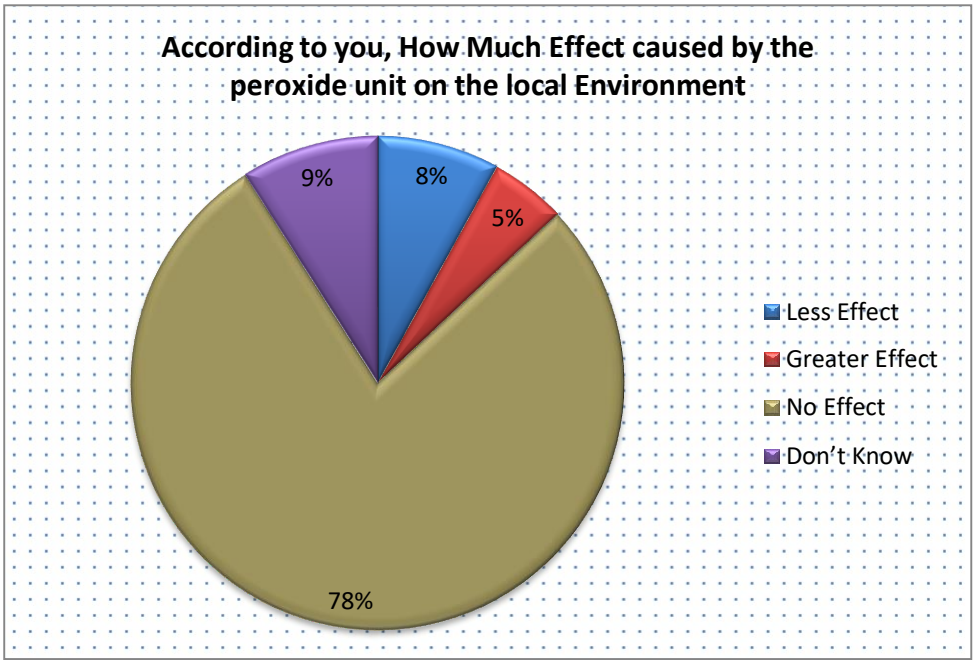

Figure 5: Ratio of respondent having different views regarding impact on environment

Discussion:

As per survey, 78 % respondents remarked that there is no effect caused by the proposed project on the area environment while 9% respondents had no point of view regarding the project activity, 8% respondents remarked that subject activity has less effect on the environment of area and only 5% remarked that construction activity has greater effect on the environment of the area.

Discussion:

As per survey of the area and graph indicates, some people gave remarks that there are higher air pollution (i.e. 14%) by the subject project, some people said that there is soil pollution caused by the proposed project (i.e. 3%) by the subject activity. Maximum/ number of people said that there is no pollution caused by the subject project while some people said that water pollution (i.e.8%) and little bit odor (i.e.2%) caused by the subject activity.

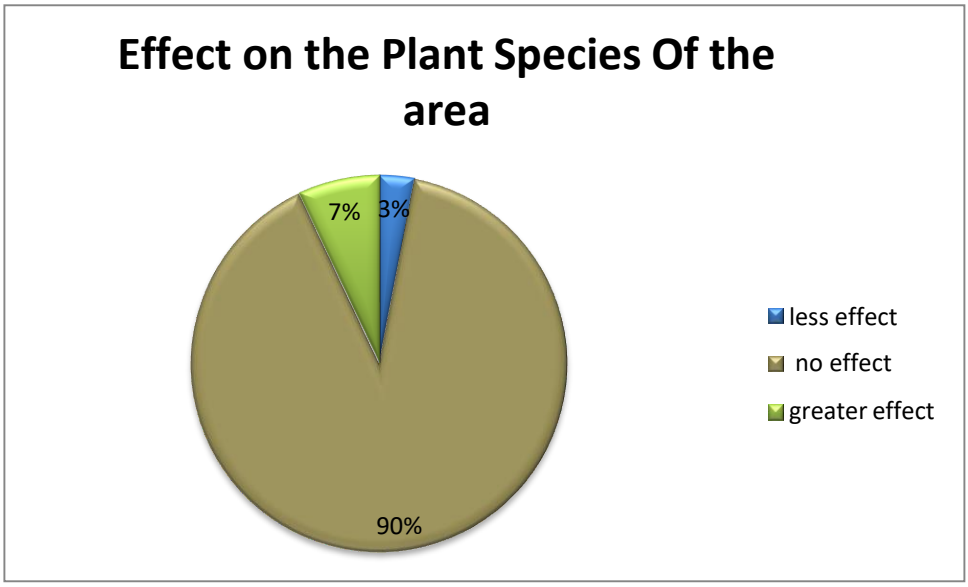

Figure 7: Effect of proposed project on flora

Discussion:

As above graph indicates, 90% of the respondents remarked that there is no effect caused on the plants species by the construction and operation of the proposed project, 7% said that there is greater effect can cause on the plants species by the subject activity by clearing the plants at the time of construction and 3% said that less impact will be cause by the subject project on the plants species.

Chapter # 8

CONCLUSIONS & RECOMMENDATIONS

Based on the study conducted for Environmental Impact Assessment (EIA) for the subject project, the following conclusions are made:

CONCLUSIONS

- The EIA study reveals that the project is economically viable, socially acceptable and environment friendly.
- The Proponent will implement the project in the environment friendly manner.
- Project Proponent will adopt the proper solid waste management system.
- Proponent will adopt all the necessary measures to control any impact if resulting from the project.
- Project Proponent will provide the safe drinking water to all workers and staff.
- It will generate additional jobs during construction and operation phases.
- M/s Star Waste Management Facility intends to register the project with local Government.
- Project Proponent of M/s Star Waste Management Facility has prepared and implemented very comprehensive Emergency Preparedness and Response Standard OperatingProcedures.
- The Proponent has committed to adopt proper waste management system and implement the project in the environment friendly manner and adopt every possible measure to control any impacts resulting from the subject project.

- Project Proponent has prepared and implemented very comprehensive Security and Fire Fighting Standards Operating Procedures.
- The impacts of Installation of incinerator plant in area will be insignificant, provided the generic mitigation measures proposed in this report are implemented. In areas where proposed site may have a significant impact, additional mitigation measures are given to reduce impacts to as low as reasonably possible.

Main environmental issues are as under:

- Production of Solid Waste/Ash
- Gaseous emissions
- Generation particulate maters
- Generation of noise

The present site meets all the requirements of a safe, spacious, clean and environment.

RECOMMENDATIONS

- In view of the comprehensive screening process and findings of the present study there is no need of conducting further investigations.
- Tree plantation inside and near the project area is recommended.
- Devices will be installed for reduction of Stack emissions.
- Ash generated from incinerator will be disposed of carefully in the nearest side
- Handling and storage of solid waste will be in sound manner.
- The management of M/s Star Waste Management Facility will continue to assistthe local communities as a corporate/social responsibility (CSR).
- Any seepage and leakage will be control through proper mitigation measures
- Sound proof room should be constructed for generator to control the sound of it.
- Use of narcotics and smoking must be prohibited during working, filling or handling of fuel.

- PPEs must be provided to workers such as gloves, masks, etc.
- Proper solid waste management system must be adopted
- Safety signs, safety board's etc. must be placed on site during various developmental stages.
- Machinery will be never is left in running condition.
- First Aid measures, health & safety Equipment (PPEs) will be provided to workers.
- Fire Fighting station & system will be installed.
- The management of subject project will assist the local communities as a corporate/social responsibility.
- Jobs and employment will be provided to the local area

The present EIA report is enough to meet the administrative and legal framework. Therefore, the environmental approval may be accorded for the present project.